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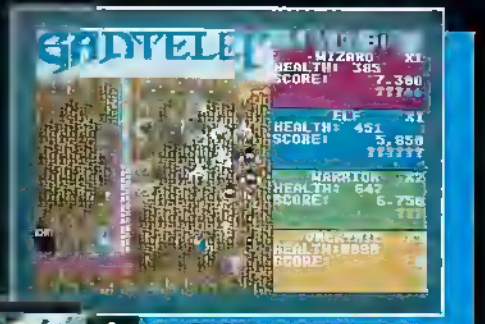

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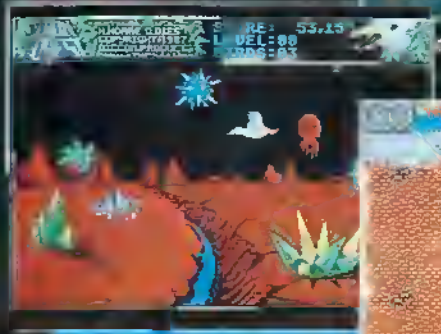

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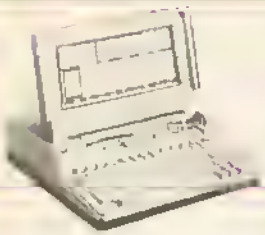

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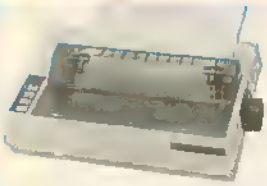

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Letters to the RAINBOW

BACK TALK

Editor:

I was a bit dismayed by Richard Esposito's answer to Elbert Jenkins in the September '88 "Doctor ASCII" column [Page 138]. He infers that Mr. Jenkins problem with writing to the *VIP Library* disk has to do with copy protection. This is not the case at all! Mr. Jenkins finds zero grans available on the disk because the "leftover" room on the disk has been disabled by placing a value in the GAT pointing to this area. Primarily, this is done to prevent writing to the master disk and possibly crashing it. Mr. Jenkins could (on a backup) use his *VIP DiskZap* to find a full granule that is open and place $FF in the GAT at the byte pointing to that granule. Then he could save his program to the disk.

D.S. Ricketts
Boring, OR

REVIEWING REVIEWS

Editor:

I am very fond of *VIP Writer III* and thought that I should add a couple of comments to Ms. Willoughby's nice review of it. The customizer program is apparently much more extensive than indicated in the review. It not only configures *VIP Writer III* with the screen width, line width, screen and printer margins, baud rate, parallel or serial printer driver, etc., it also has three programmable function keys so that they are available as soon as you boot up the program. Ms. Willoughby mentions the use of the CLEAR key as a "control key," just like the old *Writer*. The CTRL key serves the same purpose now, so you have a control key on both sides! Ms. Willoughby didn't like the partial saving of the text if the cursor wasn't at the top of the file — I consider that little feature a *vital* asset because many times I need to save only a portion of the buffer. And, as stated in the review, *VIP Writer III* does tell you that you have done only a partial save — in text and with a loud *bong*. Finally, when overstriking a line of text and going past the end of that line, all you have to do is press BREAK to take out the newly inserted line and simply delete anything necessary.

D.S. Ricketts
Boring, OR

INFORMATION PLEASE

Editor:

I run a 24-track studio and own three CoCos for music production and would like to know if anyone out there has a patch or modification for Radio Shack's *Audio Spectrum Analyzer* for the CoCo 3.

Michael Bridges
Germantown Recording Studio
1209 Ave. N.
Nashville, TN 37208

HINTS & TIPS

Editor:

I recently ruined my Multi-Pak Interface by trying to upgrade it myself, so I wound up buying a new one. In Marty Goodman's "CoCo Consultations," July '88 [Page 146], Marty said that Tandy was not selling CoCo 3-compatible Multi-Paks. I wrote Tandy and was told that the discontinued Multi-Paks were the ones with the satellite board installed. So, if you are thinking about buying a new Multi-Pak for the CoCo 3, first look in the port that plugs into the CoCo. If you see a small satellite board, the Multi-Pak is upgraded. If not, you will need to upgrade.

I have also heard that the new Multi-Paks have a small side effect. When you turn off your CoCo, sometimes the drive motor comes on. This is due to noise being introduced into the Multi-Pak through the CoCo. If this happens, press reset, or turn both the CoCo and the Multi-Pak off and on again.

John Cleaveland
Lunenburg, Nova Scotia

A Memory Aid

Editor:

Since my purchase of ADOS and *Sub-Battle Simulator*, I have had to memorize several commands for each of my command keys. Instead of memorizing the commands for each program, I have made several placards, which frame my keyboard. On these placards — one for each program — I have written the functions of the various keys either next to the key or in the margin. Poster board, manila folder, etc. could be used to make the placards, and you can make as many as you need.

Also, as a member of the printing industry, I was quite impressed with your May and June covers. I think that they are the best covers you've printed to date. I think the coated paper cover for the July issue and the decision to seal the magazine in plastic were great ideas. Sealing the magazine in plastic not only protects the product, but it also looks sophisticated.

Craig Bathurst
Greenville, SC

KUDOS

Editor:

I live in New Zealand and have been operating a Color Computer for about four years. I own a CoCo 3. As a teacher, I find my computer an invaluable aid to preparing work for my pupils. Unfortunately, the CoCo is no longer sold in this country, and all necessary computer purchases must be ordered from various places in the United States. I write to thank you for your impressive publication and to offer some advice to others in my situation.

THE RAINBOW is a must for anyone in an isolated situation. The ads and the reviews really help users to choose the best software for their needs. I have had to purchase a lot of software since I upgraded to my CoCo 3, and every issue of RAINBOW tempts me to purchase more. While I have been more than happy with most of my purchases, there are occasional problems. The *general* rule seems to be that the more you pay for software, the better it is.

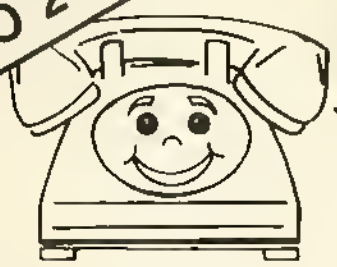
Another tip I must pass on to others in my situation concerns mail order suppliers. There is nothing more nerve-wracking than to order an expensive or delicate item by phone and then to wait as the weeks tick by, peering hopefully into the mailbox every day. I have ordered from many suppliers and would like to recommend those who have provided excellent and reliable service.

Computer Plus heads my list. It provides friendly and reliable service of the first order. Microcom Software can also be relied upon, and Micro World is another firm that provided regular first rate service.

Thank you, RAINBOW, for providing a contact with the rest of the CoCo Community.

Phil Burt
North Canterbury, New Zealand

RUNS ON COCO 2 & 3



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PEN PALS

• I am a 17-year-old grade 12 student at St. Jerome's High School in Kitchener and would like to have pen pals from anywhere, but preferably close so we can meet sometimes. I have a 64K CoCo 2, one disk drive, a tape recorder and a DMP-130A printer. I like writing special-purpose programs and would like to help anyone with problems.

Anton Peter Milardovic
8 Smetana Dr.
Kitchener, ON, Canada N2B 3B8

• I am a 16-year-old male and would like to hear from anyone in the United States. I prefer someone around my age, but I will answer anyone. I have a 64K CoCo 2, CoCo 3, disk drive, cassette recorder, Multi-Pak, DMP-130, RS Speech & Sound Pak and *Orchestra 90*. I an interested in music, graphics, machine language, Adventures and games.

Orman Beckles
45 Meridian St.
Malden, MA 02148

• I am a 20-year-old man looking for pen pals who have a CoCo 2 or 3. My system includes a CoCo 3, 501 disk drive, cassette recorder and DMP-105 printer. My other interests are sports, baseball-card collecting and photography. I will answer all replies.

Charles Braude
69-10 Yellowstone Blvd.
Forest Hills, NY 11375

• I am 14 years old. I have a CoCo 3 and my hobbies are freestyle skateboarding and swimming. I love to listen to music and watch movies. I would like for a girl my age or older to answer my letter, but if anyone else writes, I'll answer as many as possible.

Timothy W. Smith
Rt. 1 Box 147
Leland, NC 28451

• I am 13 years old and would like some pen pals from all over the world. I own upgraded CoCos 1 and 2, a DMP-105, FD 502 and a Multi-Pak Interface. I love Adventure games and science. I will answer all letters — no age limits.

Juli Williams
Star Rt. 24-2A
Graford, TX 76045

• I am 16 years old and looking for pen pals aged 14 to 21. I am interested in everything about my computer. I have a 64K CoCo 2, one FD 500 drive and a DMP-110. I welcome letters from all over the world.

Bednarek Luc
Hanebergstr. 62
3960 Beverlo
Belgium

• I am 16 years old and interested in a pen pal. All letters will be appreciated.

Christie Goedert
Rt. 3 Box 265
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Computer Uses — You Decide

My all-time favorite computer story is about the friend who came over many years ago, to look at my new Color Computer.

It was hooked up to a television set (that being the monitor) in our spare bedroom — somewhat affectionately known as the "blue room" since the walls were painted blue and there was a blue carpet on the floor — and sat in regal splendor on a roll-top desk I had bought several years before.

"What does it do?" he asked.

Since this was a 4K Color Computer (the largest amount of memory at the time) with BASIC built in, and since I had just taught myself some very basic BASIC, I did some simple things like changing the color of the screen, making the computer count to 100 very quickly and the like.

Even then, I am afraid, I was into toys. My friend had been through several crazes, suffered through explanations of why this or that was the greatest thing since sliced bread, and watched and waited as I grew tired of them. I am sure he viewed the computer as "Lonnie's latest toy" and viewed my enthusiasm with skepticism.

After a half-hour demonstration, he asked me one simple question: "But how do you ask it questions and get answers?"

"You don't," I replied. "It only gives you back what you have put into it."

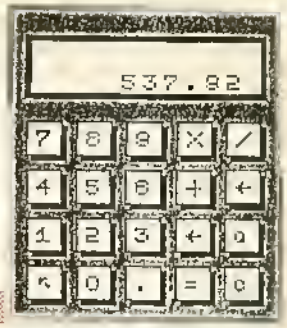
"Well, what good is it?" he asked. "I want answers to questions."

Today my friend has two computers in his house. One is a Color Computer; the other is a Tandy 1000.

I am relating this story because this is our November issue and you can do a friend of yours a favor by telling him or her about your computer.

(continued on Page 14)

Word Power 3.2



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Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K on 128K and over 450K on 512K CoCo 3** for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in **two columns!** Create professional documents without hours of aligning text.

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PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

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Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

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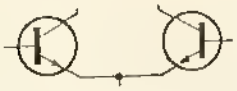

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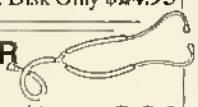

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Obviously, I did not "get tired" of my computer. The reason is a very simple one — and it really relates to the complaint my friend had when he first saw my first computer. Our computers, all of them, are really nothing more than empty boxes waiting to be filled with whatever we are interested in.

That is the secret, of course.

No matter what your interest, you can "fill up" your Tandy computer with information about it. Art and words, data (read that information of any kind) and communications — whatever it is, you have the empty box right there, and you can fill it to the brim with your own interests.

I have heard literally hundreds of stories over the years from people who bought a computer for one single reason or another — to balance a checkbook, to play games, to write letters — and found that simply and easily, just by adding another program, they could make it do all of those things and so much more.

I think my favorite recreational use of the computer is using my desktop publishing program to create little "newspapers" celebrating one event or another in the lives of my family and friends.

"Our computers are really nothing more than empty boxes waiting to be filled with whatever we are interested in."

When the friend I mentioned at the start of this column turned 45, I did a special "newspaper" for him — all about him. When my daughter was married a few months back, there was another. Other events have been "celebrated" in the same way.

For me, these are creative and fun. But the nicest thing of all is that doing just them would never justify the expense of a computer. So, at home, *I also* play some games, keep track of expenses, have files of all my books and do a myriad of other things. Yes, interest in this or that will flag, but, remember, the computer is just an empty box waiting for me to fill it up.

I know most of you know this. But I am sure you have friends who do not. Do them each a favor. Tell them to buy computers as presents to themselves next month.

And, yes, tell them to get that Color Computer from Tandy. Because, as time has proven, there really is no better value.

— Lonnie Falk

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- ★ **Automatically Centers Each Line of Text**
- ★ Allows editing of label before printing
- ★ Program comes with 24 labels to get you started
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Modifying the CoBBS system to work with the CoCo 3

A CoBBS Update

By Kevin Sloan

Since 1985 many Color Bulletin Board Systems have been in use. When Tandy introduced the Color Computer 3 in mid-1986, many of the people who had been running *CoBBS* on their CoCo 2s upgraded to the more powerful CoCo 3, only to find out that their bulletin boards wouldn't work.

The incompatibility lies in the new interrupt structure. Since memory in the CoCo 3 can be "moved" with the memory management unit, an additional interrupt service was added to keep the machine from performing an interrupt to an area of memory that had been moved. For instance, when you do an HSCREEN2, memory at $60000 to $67FFF is moved into the CPU (central processing unit) address space of $2000 to $9FFF. If the IRQ (the interrupt that keeps the time on the timer function and in the software clock of *Coterm*) is serviced while the Hi-Res screen memory is in this location, BASIC crashes. Therefore, the initial interrupts were changed to point to $FEEE instead of $100.

The software clock in *Coterm* is the specific culprit. It pulls the IRQ address from $FFF8 and $FFF9 and tries to put its "detour" into $FEF8 and $FEF9 (where $FFF8 and $FFF9 point). The result is a foregone conclusion — the computer will crash and lock up.

The fix is very simple, and all changes that follow are to the original *CoBBS* system series appearing in THE RAINBOW from November 1985 to February 1986. To fix the software clock, just put these three pokes in STARTUP right after *Coterm* is loaded from disk:

```
71 POKE &HF78, &HBE
72 POKE &HF79, &H01
73 POKE &HF7A, &H0C
```

The software clock in *Coterm* can now be used with the CoCo 3 as it would be normally with the CoCo 1 or 2.

But that's not all you must do to get *CoBBS* working. You need to remove the useless Error Trapper, since the CoCo 3 has that built in. To ensure that it is not poked into memory, delete the GOTO 250 in Line 210 in STARTUP:

```
210 FOR A=&H10D5 TO &H10D7:POKE
A,&H12:NEXT A
```

Next, all of the RUNTs need to be changed to ON ERR GOTO. Here is a list of the line numbers in USER/SYS and COBBS/SYS where they can be located:

USER/SYS lines:
10, 20, 61, 64, 66, 68, 70, 80, 110, 180, 210, 305, 365, 371, 410, 415, 420, 430, 510, 905, 980, 7025, 7030, 8005, 9005 and 9610.

COBBS/SYS lines:
9, 11, 70, 405, 555, 604, 655, 1005, 1190, 1205, 1215, 1226, 1228, 1235, 1245, 1255 (two changes), 1275, 1290, 1310, 1340, 1342, 1345, 1375, 7025, 7030, 7040, 7041, 7060, 9615 and 9810

An easier way to do this is to save USER/SYS and COBBS/SYS as ASCII files. Then load them up in a word processor and do a universal change of RUNT and RUN T to ON ERR GOTO (*Disk Color Scripsit* doesn't work very well because of its buffer size).

The error-trap processing needs to be upgraded to work with the CoCo 3's new commands as well. Make the following changes: In USER/SYS, delete lines 915, 920, 925, 930 and 935. Then retype Line 935 to read:

```
935 ER$="**Error: Type"+STR$
(ERNO)+" inLine"+STR$(ERLIN)
+":User"
```

In COBBS/SYS delete lines 1180, 1181, 1182, 1183 and 1185. Retype Line 1185 to read:

```
1185 ER$=CHR$(13)+"*ERROR"+
STR$(ERNO)+" IN LN"+STR$
(ERLIN)+"*":GOSUB870:
PRINTER$:GOSUB9615:TR$=
STRING$(32,"+")+CHR$(13)
+ER$+CHR$(13):GOSUB9600
```

To take advantage of your CoCo 3's Hi-Res text screens. Make the following changes to USER/SYS:

Add Line 6: `6 WIDTH32: PALETTE 13,0: Palette 12,63`

Change the CLS0 to CLS in Line 34:

```
34 II=TIMER:IFII>19999AND
PEEK(4694)<>0THEN CLS:IFII
>60000THEN TIMER=20000
```

Insert `WIDTH40:PALETTE8,63:CLS3` in Line 40:

```
40 WIDTH40:PALETTE8,63:CLS3:
EXEC&H10DA:POKE4657,0
```

Insert `WIDTH40:PALETTE8,63:CLS3` in Line 66:

```
66WIDTH40:PALETTE8,63:CLS3:
GOSUB9000:IFK1=0THEN67ELSEGET
#1,1:RE=CVN(H1$):GET#1,2:RS
=CVN(H1$):CLOSE
```

Now your *CoBBS* system should work on your CoCo 3. I will be happy to help you with this upgrade. My bulletin board runs from 10 p.m. CST to 1 p.m. CST of the next day Monday through Friday, or I'll put the system up at any other time upon request. Just call at 300 bps, 7 bits, one stop bit, 601-693-8092.

Editor's Note: The modified COBBS/SYS and USER/SYS files are included on this month's RAINBOW ON TAPE and DISK.

(Questions or comments concerning this upgrade may also be addressed to the author at 3228 11th Place, Meridian, MS 39305. Please enclose an SASE when requesting a reply.)

Kevin Sloan, a computer operator and programmer by profession, has been using the CoCo for five years and is a very active member of his local user group.

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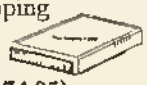

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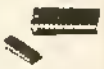

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The Amazing A-BUS

NEW

An A-BUS system with two Motherboards
A-BUS adapter in foreground
The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

Plug into the future

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT for PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card — RE-140: $129

Includes eight industrial relays (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card — RE-158: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card — AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter — AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel (Expand to 8 channels using the RE-156 card)

Digital Input Card — IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O — DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm — CL-144: $89

Powerful clock/calendar with battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder — PH-145: $79

Each tone is converted into a number which is stored on the board. Simply read the number with INP or PEEK. Use for remote control projects, etc.

A-BUS Prototyping Card — PR-152: $15

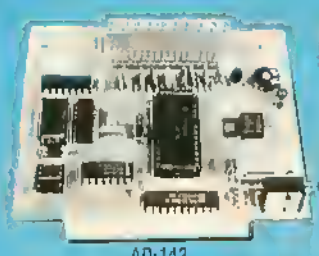
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s

ST-143

CL-144

RE-140

IN-141


AD-142

Smart Stepper Controller — SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs. 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option — RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option — PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option — BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver — ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143 — **PA-181: $99**

Stepper Motors — MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step, 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

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Apple II, II+, IIe. Uses any slot	AR-134 .$49
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TRS-80 Mod 3,4,4D. Fits 50 pin bus (With hard disk use Y-cable)	AR-132...$49
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Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) — CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: — CA-162: $34

A-BUS Motherboard — MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161, $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

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ISSUE #70, APRIL 1988
BLOTTO DICE
SUPER COM
GENESIS ADVENTURE
PLANETS
PHK/WAR
SIGN LANGUAGE
ARX SHOOTOUT
ELECTRONICS 13
MAGIC KEY
SNAP PRINT

ISSUE #71, MAY 1988
SUPER LOTTO
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5	13	21	29	37	45	53	61	69
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VIP Writer III 2.0

495K Total Text Space • EASY 4 Color MENUS

"In the beginning there was VIP Writer and users saw that it was good, But it's not the best anymore. There's a new word processor to claim the crown...VIP Writer III –Setting the Standard" –RAINBOW Sept. 1988

COMPARISON CHART			
	VIP Writer III	Telewriter 128	Word Power 3
Screen Display	32/40/64/80	40/80	80
Spelling Checker	VIP Speller	NONE	FREE WARE
Dictionary Size	50,000 Words	NONE	20,000 Words
Print Spooler	YES	NONE	YES
Total Space 128K	**106,000**	48,000	72,000
Total Space 512K	**495,104**	48,000	450,000

SCREEN DISPLAY OPTIONS

VIP Writer III offers more screen width options -all with 24 lines and actual lower case letters using the CoCo 3's hardware display. It runs at double clock speed and has 4-color menus making VIP Writer III FAST and EASY to use! You can choose foreground, background, hilite and cursor colors from up to 64 hues. Color can be turned ON or OFF for the best possible display using a monochrome monitor or TV set. VIP Writer III has a context sensitive help facility to display command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

TEXT FILE STORAGE

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE!

PREVIEW PRINT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

PRINTING

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

PRINT SPOOLING

Save up to $150 on a print spooler because VIP Writer III has a built in print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job!

SPELLING CHECKER

VIP Writer III includes VIP Speller AT NO ADDITIONAL COST! VIP Speller checks text for misspelled words and has a 50,000 word dictionary that can be added to or edited.

DOCUMENTATION

VIP Writer III comes with a well written 125 page manual which is Laser printed, not dot-matrix like the competition. It includes a tutorial, glossary of terms and examples for the beginner as well as a complete index!

VIP Writer III includes VIP Speller. DISK $79.95

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

VIP Writer owners: Upgrade to the VIP Writer III 2.0 for $49.95 + $3 S/H. Send ORIGINAL disk and $52.95 total.

VIP Database III

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator with unlimited print format capabilities including embeddable control codes for use with ALL printers. DISK $69.95

VIP Database owners: Upgrade to the VIP Database III for $39.95 + $3 S/H. Send ORIGINAL disk and $42.95 total.

VIP Library

/Writer Database Enhanced

The VIP Library /WDE combines all six popular VIP application programs - VIP Database III, VIP Writer III, VIP Speller, VIP Calc, VIP Terminal and VIP Disk-ZAP - into one program on one disk! The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail merge, spreadsheet financial analysis, telecommunications and disk maintenance.* DISK $169.95

For VIP Library shipping please add $4 USA. $5 Canada. $10 Foreign.

VIP Library owners: Upgrade to the VIP Library /WDE for $89.90* + $3 S/H. Send ORIGINAL disk and $92.90 total.

* Future VIP Library upgrades available at reduced cost.

All products run under RSDOS and are not copy protected.

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Non VIP Library orders add $3 for shipping and handling in USA. Canada $4. Foreign $6. COD orders add an additional $2.25. Checks allow 3 weeks for delivery. All other orders are shipped the same day.

Telewriter 128 is a trademark of Cognitec. Word Power 3 is a trademark of Microcom Software.

CoCo Gallery

1st Prize
CoCo 3

Richard Perreault
Tiger

Richard, a student in Boucherville, Quebec, used *CoCo Max III* to develop this view of this fierce, flesh-eating native of Asia. Richard enjoys skiing, fishing and computing.

3rd Prize

Robert Williams
C-O-ARMS

CoCo 3 BASIC was used to create this scene. Robert has been using a CoCo for four years, enjoys role-playing games and lives in Lucasville, Ohio.

1st Prize
CoCo 1 and 2

Mark Winship
Spacecraft

Deskmate and the CoCo 2 were used to illustrate Mark's idea of a traveling spacecraft. He lives in Houlton, Maine.

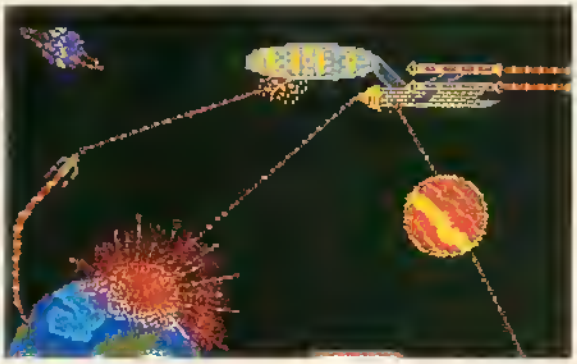
SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator



2nd Prize

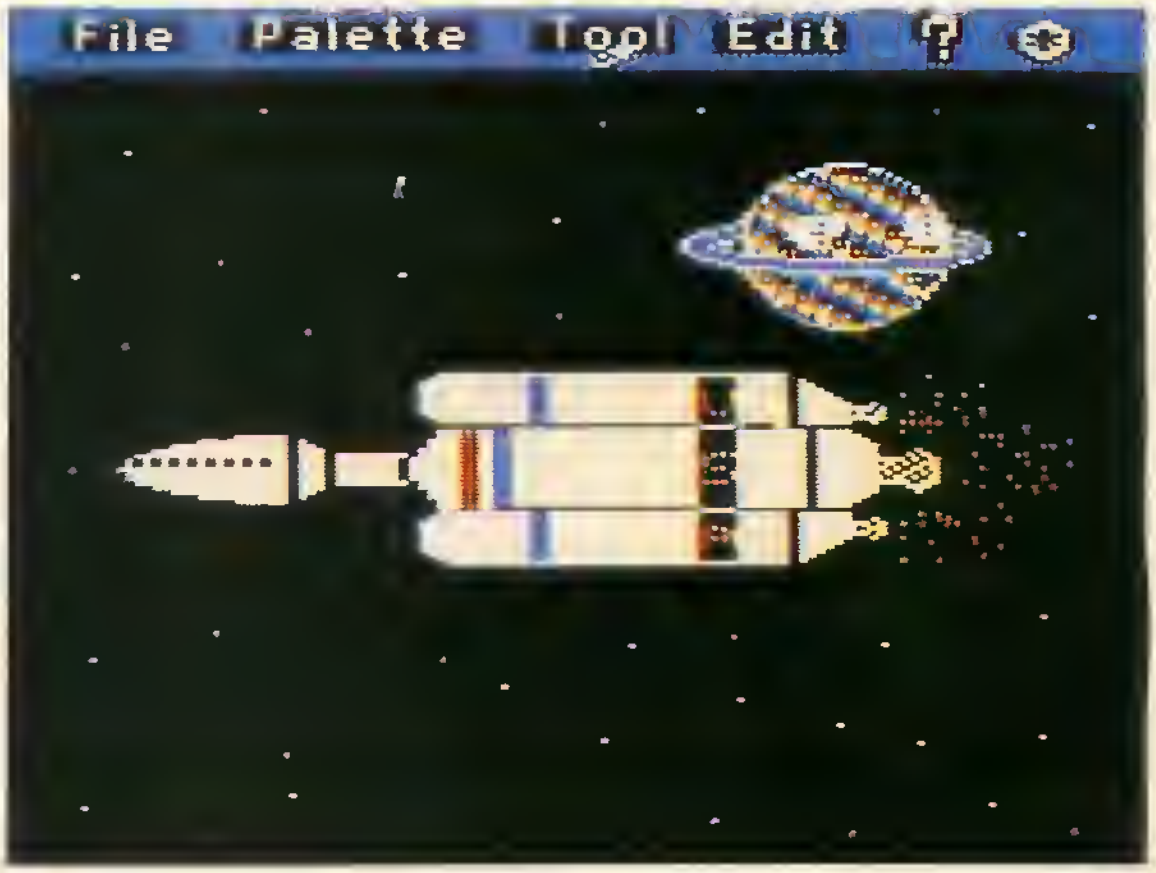
James Farmer
Starship

This animated scene was developed with *CoCo Max III*. James lives in North Charleston, South Carolina.

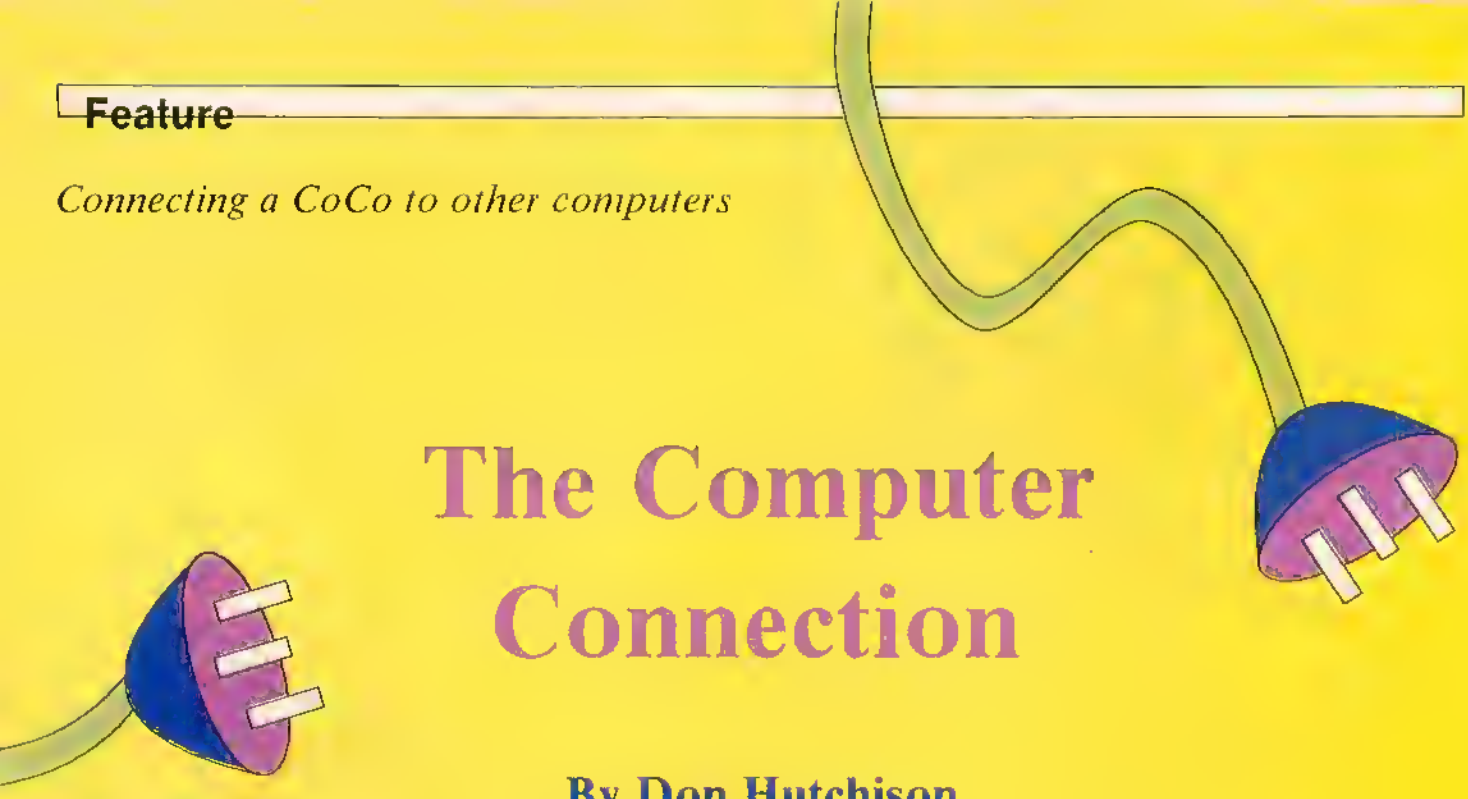
Honorable Mention

Wally Mayes
Eagle

Wally, a machinist in Hamilton, Ohio, used *CoCo Max III* to develop this depiction of the national emblem.



Connecting a CoCo to other computers



The Computer Connection

By Don Hutchison

When I travel, I like to use my portable Tandy 102 both to stay in touch with Delphi, and to generate short messages and text files for articles, Delphi Mail, Help notes, etc. I enjoy the convenience of using the 102 almost anywhere. Sometimes, I sit on my sofa and use the 102 while watching TV or talking on the phone. I am sure that there are many others who like the 102 for the same reasons.

In the past, however, I felt restricted by my portable's inability to format. I wanted to transfer the text to my CoCo 3 to use its word processor for cleanup, formatting and final printing. I also wanted to transfer PCM ON DISK programs from my PC compatible to my Tandy 102. I began looking for a way to transfer programs from my PC compatible to my 102. Once I solved that problem, I began looking for ways to connect the PC compatible to my CoCo.

There are many reasons to use a second computer to download programs. You may choose to use your PC compatible because it has a hard drive or because your IBM terminal program provides support for *batched* uploads and downloads. (This option allows the transfer of multiple files with little or no operator intervention, and if you are paying for access to an information service, the time savings can be significant.) Programs that are downloaded onto your PC compatible can be transferred to your CoCo at your leisure by using the techniques described in this article.

Although you won't be able to transfer MS-DOS programs to your CoCo and expect them to operate correctly, the CoCo and the PC compatible are now connected in a manner that allows them to communicate. If you prefer to download programs from Delphi onto a hard drive, there is now a convenient way to transfer the files to your CoCo.

Background

Generally, computers are not sociable things. Indeed, they prefer to be left alone. A computer chooses one owner and will do what that owner asks of it, but it usually prefers not to communicate with other computers. Fortunately, computers can be made to talk with each other rather easily.

Let's begin by looking at the basics of computer interface. I'm a big fan of the KISS principle (Keep It Simple and Straightforward) so I looked for the minimum equipment needed to get two computers to talk to each other. Simple communications like the ones we'll be discussing are based on the use of just three signal lines: a line on which to *talk*, one on which to *listen* and a *common* line for the sake of electrical completeness.

There are two complementary configurations for the standard RS-232 interface: DTE (Data Terminal Equipment) and DCE (Data Communications Equipment). As the name implies, Data Terminal Equipment consists of those devices operating as terminals, and Data Communications Equipment is comprised of those devices designed to communicate with the outside world. The two devices are actually *designed* to be directly connected to each other.

A modem is a typical example of DCE gear, and portable computers, such as the Tandy 102, are examples of DTE gear. When a computer is imitating, or *emulating*, a terminal, it is configured to operate as DTE.

Although this sounds complicated, all we are defining is how a computer *listens* for information and *talks* to other devices. For example, DTE hardware uses Pin 2 to send data, and DCE equipment uses that pin to receive data. So, when the two devices are connected, one talks while the other listens. In fact, both units can be talking *and* listening at the same time. Humans should be so lucky.

To get your CoCo to communicate

Don Hutchison is an electrical engineer living in Atlanta, Ga. He works as a senior project engineer and is involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW SIG. His Delphi username is DONHUTCHISON.

Telewriter-128™

the Color Computer 3 Word Processor

TELEWRITER: UNDISPUTED #1

If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

Fact 1: Telewriter is undisputedly the #1 most popular word processor on the Tandy Color Computers.

Fact 2: Telewriter's exemplary ease of use and power have been acclaimed in numerous magazine reviews and in thousands of letters and calls from end users.

THE OTHERS DON'T UNDERSTAND

So why has Telewriter gained such a large and loyal following, while other Color Computer word processors have come and gone? Ironically, our competitors' ads tell you *exactly* why.

For them, word processing is nothing more than features and numbers. The longer the list of features, and the bigger the numbers, the better the word processor. Or so they think.

They just don't understand that power and ease of use are not gained by tacking on random features or throwing in freebie utilities or forcing you to use a cumbersome mouse.

Real Power, *true* Ease of Use, and *genuine* Speed can only be attained through thoughtful, logical, intelligent design, attention to detail, and a commitment to the act and the art of writing. That's the Telewriter tradition, and that's the reason for Telewriter's phenomenal success.

TELEWRITER—128: INTELLIGENT DESIGN PERFECTED

And now, Telewriter-128, the latest Telewriter, uses the added hardware power of the Color Computer 3 to bring this intelligent design to its logical perfection.

Telewriter-128 adds unsurpassed speed and important new features to the already impressive arsenal of Telewriter-64. Not just speed for speed's sake, or features for the sake of advertising—but speed where it counts and features that make you a more efficient, more effective writer.

Rainbow magazine put it this way: "Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user friendly. . . . The 81-page tutorial/user's manual is nicely done. It is written in easy to understand language but the program itself is so easy. . . . Most people will be able to use the software right out of the package."

TELEWRITER-128 OR DESKTOP PUBLISHING

Desktop publishing is nice for adding pictures and fancy fonts to newsletters or business presentations—but its graphics orientation sacrifices some important capabilities when it comes to working with words.

If your main concern is expressing ideas through words (notes, letters, reports, papers, novels, etc.), the dedicated word processing power of Telewriter-128 still provides the most efficient tool for the job. Each tool has its place—desktop publishing for striking visuals, Telewriter-128, for effective writing.

TELEWRITER-128 OR TELEWRITER-64

You can no longer afford to be without the ease, power, and efficiency, that Telewriter brings to everything you write.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

For the Color Computer 1&2, **Telewriter-64** costs $59.95 on disk, $49.95 on cassette.

To order by MasterCard or Visa,
call **(619) 755-1258** anytime, or send check to:

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Del Mar, CA 92014

(Add $2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and $41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing **1-800-321-3133.**

Ask for: **Telewriter-128** (disk) . . . cat #90-0909
Telewriter-64 (disk) . . . . cat #90-0254
Telewriter-64 (cass) . . . . cat #90-0253

FEATURES THAT MATTER: Telewriter's outstanding design and its complete set of features, put it in a class by itself, for smooth, efficient writing and letter perfect printed documents. Telewriter-128 includes:

Unbeatable SCREEN PERFORMANCE: lightning fast paging and scrolling, on-screen text that never lags behind your typing, and a response that is always instantaneous, no matter how much text is in the buffer, or where you are in the document.

26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The On-line OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count, free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

with another computer, you only need to run a cable between the two computers, using the necessary adapters. In addition, these computers will run the terminal program of your choice.

Communicating with Another CoCo

It is probably easiest to get CoCos to communicate with each other because, like their owners, CoCos are pretty gregarious. They like to get together and communicate, especially online on Delphi and at RAINBOWfests. They even exchange pictures.

It's a simple matter to connect two CoCos by using a cable to connect the two serial ports. Just *crisscross* the send-data and receive-data lines. In other words, connect the send-data line from one CoCo to the receive-data line on the other, and vice versa. When one CoCo talks on a signal line, the other CoCo listens.

To construct the necessary cable, use two four-pin DIN plugs (Part No. 274-007) and a suitable length of cable. The cable itself is not usually crucial in short-to-intermediate lengths, such as six to 15 feet. Electrically, the cable would follow as shown below:

	CoCo 1	CoCo 2
Receive Data	2	4
Signal Ground	3	3
Transmit Data	4	2

The Carrier Detect (CD) function, Pin 1, is not needed for most CoCo terminal programs. Although the popular terminal programs *GETerm*, *Mikeyterm* and *Rickeyterm* do *not* require a carrier detect signal to operate, some terminal programs *do* require the carrier detect line to be active. Because this function is normally provided by the modem, you must take steps to provide the carrier detect signal if you choose to use such a terminal program. Usually, the CD signal can be activated with a signal (such as DTR) that is obtained elsewhere.

After the computers are physically connected, simply load and run your favorite terminal program on each computer. This will allow you to transfer files back and forth. Pretty simple, huh?

I generally use the CoCo's standard four-pin DIN serial port for this type of communication because it is convenient. The serial port (on any model of CoCo) is adequate for the short files I transfer, and it usually operates reliably at speeds up through 1200 bits per second. The CoCo 3 is capable of operating at 2400 bits per second through the serial port; however, I've been able to use only 300-band communications under OS-9 because of the increased system overhead.

Remember that several terminal programs will automatically sense the presence of an RS-232 pack, so remove it from your system before running the terminal program. *GETerm*, *Mikeyterm* and *Rickeyterm* all *auto sense* the RS-232 pack.

Remote Connection under OS-9

OS-9 offers a unique method for connection through the serial port. This operating system allows you to use a separate terminal (such as a Tandy 102) to access OS-9. When you are connected to OS-9 in this fashion, you can type on either the main CoCo keyboard *or* the remote keyboard. OS-9 will honor requests from either source. Although some things can't be done from the remote keyboard (like showing windows on a Tandy 102), it's still fun to use.

To link to OS-9, execute the `XMode` utility to configure the serial port for use with an external terminal. To configure the port for 300-bps, 8-bit, 1 stop bit, no parity, just enter the following:

```
xmode /t1 type=0 baud=1
```

Next, invoke `TsMon` (the Timesharing monitor) with the following line:

```
tsmon /t1 &
```

This tells OS-9 to start up `TsMon` as a concurrent process. At this point, press `ENTER` from the remote terminal or keyboard to initiate the OS-9 login sequence. If you successfully log in to the system, you'll be greeted in the following manner:

```
WELCOME TO COLOR COMPUTER
OS-9
OS9:
```

When asked for a username, press `ENTER` again. OS-9 will initiate the appropriate steps to enable access to the system.

I've found this a quick and convenient way to extract text files from an OS-9 disk onto another computer. Simply display the file(s) by entering the `LIST` command from the remote terminal or keyboard, and capture the text as it's displayed.

A better way to transfer files to and from an OS-9 disk is to use an OS-9 terminal program like *XTerm*. This method works better because the system overhead is too great to allow the operating system to service the serial port as often as required when using `TsMon` with `/t1`. The CoCo's serial port is not very useful under OS-9 at speeds above 300 bits per second.

This method is useful for those wanting to extract OS-9 text files from their CoCos and use them with portable computers. It's also convenient for those who prefer a Disk BASIC word processor like *Telewriter*. The text files can be edited using the method of your choice. However, don't forget that it isn't possible to transfer OS-9 binary files to a portable (or vice versa) and expect them to function correctly.

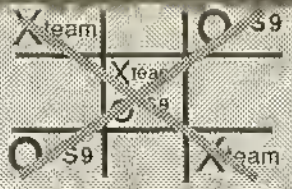
Using RS-232 Packs

Because the CoCo uses nonstandard connectors for its serial port, we'll need to look at ways we can communicate with devices that use standard connectors and interface requirements. I refer to the CoCo's serial port because this port is not a true RS-232 port. The RS-232 standard defines both signal levels and the control signals that should be present. Fortunately, the serial port is compatible enough to let us communicate with a wide variety of RS-232 devices.

It is easy to initiate communication between two CoCos if both are using RS-232 packs. Rather than using the cable described above, you'll use a standard RS-232 cable with male DB-25 connectors on each end. Your local Radio Shack sells the cable (Part No. 26-1408). Although it is called an RS-232-C cable for Model III/12, we will be able to use it with our CoCos.

We will also need a small device called a null-modem adapter. That's a rather intimidating term for a simple adapter that is used when no modem is available (hence the name null modem). The advantage of this device is that you can use the cable with your modem when communicating with Delphi, then unplug the cable and use it with a null-modem adapter to interface with another computer. Radio Shack sells a suitable null-modem adapter (Part No. 26-1496) for under $10.

XTEAM & OS-9



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A null-modem adapter is just a small box with a DB-25 connector on each end and some internal wiring to facilitate communication between two devices. The adapter connects the necessary control signals of each computer to simulate a connection with a modem or other DCE device. Additionally, the adapter crisscrosses the send-data and receive-data lines so each computer can send and receive data on the appropriate lines. Without this adapter, things would be a bit more complicated.

To use this adapter, plug one end of the RS-232 cable into one of the RS-232 packs, plug the other end into the null-modem adapter, and insert the adapter into the second RS-232 pack. Crank up your favorite terminal program on each computer, and the two computers are directly connected and ready to communicate.

Different Computers

Most computers use a standard DB-25 connector to interface with the outside world. This is what I use when I want my Tandy 102 to talk to my Color Computer. To connect another computer to the CoCo's serial port, we'll need to construct a suitable cable. Specifically, we'll need a CoCo four-pin DIN plug on one end of the cable and a standard male DB-25 connector on the other end.

It is sometimes possible to find a usable cable at your local Radio Shack, but it is no longer a standard catalog item. If you choose to construct your own cable, here is the necessary equipment:

	CoCo DIN	DB-25
Function	**Plug**	**Connector**
Carrier Detect	1	-
Receive Data	2	3
Signal Ground	3	7
Transmit Data	4	2

The Tandy 102, like many other computers, uses a maximum of seven pins in its RS-232-C interface port. The additional functions of Request to Send (RTS), Clear to Send (CTS) and Data Terminal Ready (DTR) are seldom required for the simple communications interfaces we're using. When we use a true RS-232 port, however, these signals must be properly connected. This is the function of the null-modem adapter.

You'll find some variation between the different computers regarding required control signals, so it's always best to consult the owners manual for each machine. If the other computer simply refuses to begin communication with the CoCo, experiment by connecting the DB-25 connector's Pin 20 to Pin 8. This sometimes forces the other computer to acknowledge a carrier detect signal, which in turn allows it to function correctly. Your owners manual should explain this.

As we did earlier, connect the two computers with the cable and null-modem adapter. Plug the DB-25 connector into the null-modem adapter, and plug the adapter into the other computer. Insert the four-pin plug into the CoCo's serial port and start up the appropriate terminal software for each computer.

If you choose to use your RS-232 pack to talk with the other computer, simply use the RS-232 cable and null-modem adapter as you would when using two RS-232 packs.

MS-DOS Machines

Interfacing to the PC-compatible machines involves a little trick, but the technique is still nothing exotic. Because the PC compatibles use a male DB-25 connector rather than a female connector for the RS-232 port on the rear of the computer, you must purchase a "gender-changer" adapter, which is available from Radio Shack for $7.95 (Part No. 26-1495). Use this with the null-modem adapter and either of the cables described (depending upon your particular hardware).

The shareware program, *ProComm*, is probably the most popular terminal program for the MS-DOS engines, yet it requires a little trickery to get it to work without a modem. We need to convince the terminal program that the carrier detect is active (as it would be if we were using a modem).

The easiest way to do this is to install a jumper from Pin 8 to Pin 20 inside the cable connector attached to the PC compatible. This jumper connects the DTR line from the PC compatible (normal when using *ProComm*) to the carrier detect (CD) input. At this point, *ProComm* is ready to communicate with the other computer. This type of trickery may be required when using other PC terminal programs as well. Check the documentation to be sure.

General Notes

Of course, hardware hackers will notice that a null-modem adapter could be incorporated into the design of the cable, and that a gender-changer isn't required for use with MS-DOS machines if you choose to replace one connector with another. However, the intent here is to use standard adapters and make the techniques available to most users.

If you plan on interfacing with a lot of other computers, I recommend that you purchase an RS-232 Mini-Tester from Radio Shack. This small unit, priced at $14.95, is a great time-saver. It gives a quick visual indication of the state of each line in the RS-232 interface using red and green LEDs.

It's usually wise to use terminal settings of 8-bit, 1 stop bit and no parity on each computer, because some terminal programs will not automatically adjust to these settings before beginning a file transfer. (These settings are required when using the popular file transfer protocol, Xmodem.) You must also use the same baud-rate setting between the two computers, or communications will be totally garbled and impossible.

Half-duplex operation is usually preferred, especially if two computer operators will be typing back and forth to each other. In half-duplex mode, the terminal software will *echo* each keystroke to its operator. On the other hand, if the computer is operating in full-duplex mode, the operators will type *blind* because they will have no way of seeing the characters they are typing.

If the two computer operators intend to type to each other, it's also wise to adjust the terminal settings to *insert-linefeeds* mode. If this isn't done, the lines may overwrite each other on the screen. The documentation for the particular terminal program will explain how to do this.

Finally, use protocol transfers *whenever* possible. Even when transferring ASCII text files, it's best to use an error-checking protocol such as Xmodem to provide maximum protection from errors.

Now you can connect your CoCo to your PC compatible. Enjoy the benefits of both machines with a wider selection of files.

New faces, new places and a discussion on computer viruses

Haven't I Seen You Before?

By Don Hutchison
Rainbow CoCo SIG Database Manager

Effective this issue, I will be assuming responsibility for "Delphi Bureau" from **Cray Augsburg** (CRAY). Cray has been writing the column since April, 1986, and now retires with our thanks. Don't worry. Cray will remain as the technical liaison between Delphi and THE RAINBOW. If you have a topic that you would like covered in this column, please contact me through Delphi's Mail system under the username DONHUTCHISON.

Person To Person

Delphi's newest SIG, Person To Person, is now open. This newest SIG is intended as a place for people to meet. It is accessible from the Entertainment menu, and can be found by typing GO ENT PER from almost anywhere in the Delphi system. SigOp **Shannon Yoffe** (SHANNONY) cordially invites everyone to stop by. Just sit anywhere.

One of the features of Person To Person will be the photo library. We're encouraging our members to post pictures of themselves in the database for others to view. Naturally, not everyone can digitize his or her own picture, so we have arranged for that to be handled for you. **James Farmer** (MODEMMASTER) will be more than happy to digitize your photo and post it in the SIG's database. James just needs a good photograph (the bigger the better), and he'll take it from there. Send your photo to James Farmer, 5311 Barwick Road, N. Charleston, SC 29418. If you want your photo returned, please include an SASE suitable for photos. Remember to add at least one sheet of cardboard or some other stiff material so your photo won't get crushed or bent in the mail.

James also invites calls from those who want more information about digitizing. You may contact him at (803) 552-2837. Please remember that this is in the Eastern time zone, and avoid calling during odd hours.

The Portable Place

After a bit of restructuring, the Portable Place is now open under the sponsorship of PCM. The Portable Place is dedicated to laptop computers such as the Tandy Model 100/102, 200 and 600, and the NEC portables. SIG staffers include **Marty Goodman** (MARTYGOODMAN) as house doctor, **Jim Reed** (JIMREED) as key grip and me as chief engineer. We cordially invite you to stop by.

In cooperation with PCM, THE RAINBOW's sister publication, we will have available the programs for portables from PCM ON DISK. We plan to post these files each month in a special topic of the database, where they will be available for instant access via downloading. These programs will each carry a $3 surcharge.

View Master

David Mills (DAVIDMILLS) has posted an outstanding graphics-viewing utility on the CoCo SIG. David's program, *View Master*, allows a CoCo 3 user to view most popular types of pictures using a *single* program. No more scrambling around when you want to view a particular picture — just run *View Master*. Look for it in the CoCo 3 Graphics topic of the CoCo SIG's database, and in the General topic of the database inside People To People.

Viruses

Lately, there has been a lot of publicity about the computer hazards known as *viruses*, *time bombs*, *Trojan horses*, etc. Do viruses really exist?

Yes, definitely. Some, of course, are tamer than others. We've all heard stories about a bank programmer who installed a short program into the bank's system which transferred fractional-cent values into his own account. When discovered, he had more than $30,000 in his account, which had accrued simply from the interest calculations on passbook savings accounts.

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

Database Report

The General Information topic of the database includes **Chris Burke** (COCOXT), who uploaded a product announcement for Burke & Burke's new *RSB* (which lets you run Disk BASIC programs under OS-9 Level II), and **Brian Wright** (POLTERGEIST), who uploaded a text file that describes some bugs in the Microware C compiler.

In the Applications topic of the database, **Paul Jerkatis** (MITHELEN) posted a *StarTrek* program in BASIC09. **Robert Grubb** (GRUBBY) uploaded a BASIC09 program for determining loan payoffs, and **Steve Clark** (STEVECLARK) posted an electronic mail system — including the source code.

In the Utilities topic, Brian Wright provided us with a disk editor for OS-9 Level II, which was written by Pete Lyall. **Jeff Blower** (SEBJMB) posted *SetColor*, a utility that enables the user to change foreground, background and border colors by pressing a single key. **Mike Stute** (GRIDBUG) posted a clever utility called *Insulter*, which randomly displays insults to the user, and **Brian White** (BRIANWHITE) sent us a program that will duplicate a file or directory at another location on the same device. It uses an OS-9 feature not implemented by other commands.

Brian Wright also uploaded a text file by Pete Lyall in the Patches topic of the database. This file describes how to modify the RS-232 pack to enhance telecommunications or use with an external terminal. Brian posted another file from Pete Lyall that will patch ACIAPAK's variable

However, authors of viruses for personal computer systems are probably out to destroy your data.

Just what *are* these things, and what can we do about them?

A computer virus is usually a small program that is hidden in some manner. (It may even be a part of a larger, innocent-looking Trojan horse program. An earlier name for computer viruses was *worms*.) A virus has the ability to duplicate itself and to travel to another computer through the transfer of disks or by electronic means. It may have the ability to hide within your computer for days, months or even years before activating itself. Maintaining good backup procedures doesn't prevent viral spread, because a timed release virus can also be in the backup disk or tape. Therefore, the virus is capable of destroying your data time after time.

Although Trojan horses are usually programs designed to transmit a virus into computer systems, they may be destructive programs on their own. Just as the ancient Greeks captured Troy by hiding hundreds of soldiers inside an innocent-looking wooden horse, such a

space to allow more efficient I/O at speeds above 1200 bps. **Merle Kemmerly** (TOOK3) posted a patch, for ACIAPAK under Level II, that increases the input buffer to 140 bytes to help those operating at the faster baud rates. **Dave Philipsen** (DPHILIPSEN) posted a file to fix the seven-bit Xmodem bug in version 1.0 of the terminal program, *SuperComm*. For the *Microscopic Mission* game Robert Gribb posted a patch file that allows the game to run from the current execution directory. (This also allows it to run from a hard disk.) **Larry Oheron** (LOHERON) sent us a file describing how to set up *DeskMate 3* to run from a single disk.

The Telcom topic gives us Merle Kemmerly, who uploaded Version 3.2 of the popular terminal program *Telstar*; **Jim Hollier** (PGJtM), who posted Version 3.1 of *Jterm*; and Dave Philipsen, who uploaded *SuperComm*.

In the Graphics & Music topic, **Mike Knudsen** (RAGTIMER) uploaded his arrangement of a familiar tune. **Dennis Weldy** (OS9ER) uploaded a revised version of QuadDump, a printer driver for the Quad Jet color printer. Steve Clark posted a tongue-in-cheek drawing of the Color Computer and its Multi-Pak Interface.

The Programmers Den topic includes Brian Wright, who uploaded a file that describes the inner workings of the *Citadel* BBS package and the source code for that package. Mike Stute uploaded Part 2 of the C standard library.

In the Tutorials & Education topic, Mike Stute sent us an article on dynamic allocation and doubly linked lists. Brian Wright uploaded a tutorial on OS-9 concepts, while **Andrew Ellinor** (CROPPER) sent us his text file containing an introduction to OS-9. **Kevin Darling** (KDARLING) posted a text file concerning the Multi-Pak Interface and the Deluxe RS-232 Pak.

CoCo SIG

In the CoCo 3 Graphics topic, **Mark Garbarini** (F19) posted a picture of a sunset. I uploaded the CoCo Gallery Live pictures from the Chicago RAINBOWfest. **Donald Ricketts** (STEVEPDX) uploaded approximately 60 digitized images that he had converted from DS-69B format into *CoCo Max 3* files. Donald's pictures are always quite popular. David Mills posted a *very* popular viewing utility that will allow its user to view *all* major types of picture files. David also uploaded another adult picture from Brad Bansner. **John Barrett** (JBARRETT) posted several pictures of his favorite rally cars, and **Richard Trasborg** (TRAS) uploaded over one megabyte of clip art for use with *Max-10*. These files, drawn by Mike Trammell, have been very popular.

The Source for 6809 Assemblers topic of the database gives us **Mike Ward** (MIKEWARD) uploading the source code that details how to perform disk I/O from assembly language. This file will be extremely popular with all aspiring assembly language programmers.

In the Utilities & Applications topic, **Stephen Macri** (DRACMAN) uploaded his *Alicia Calendars* programs. **Robert Pierce** (RPIERCE) posted a revised version of his popular disk editor and a 51-by-24 Hi-Res screen driver for the CoCo 1 and 2. **Tom Wyrick** (WYRICK) uploaded a program to assist in converting CoCo BASIC programs into IBM-compatible ones. **Mike Sweet** (DODGECOLT) sent us his favorite disk editor, and **Jim Shoop** (BAZAR) uploaded a patch for *MAX-10* to eliminate the need to use the "clicker." While Brian White posted a high-speed disk backup utility, **Pierre Salvail** (PSALVAIL) sent us a useful smooth-scrolling utility for the CoCo 3. **Seth Short** (SETHSHORT) provided a universal picture conversion utility. **Fred McDonald** (FREDMCD) sent us a program for printing large banners on your printer and a search program for cross-referencing BASIC programs. Richard Trasborg uploaded a VCR tape-cataloging program written by his wife. Finally, **Billy Passauer** (INDIANABILL) uploaded Version 1.5 of the *File Copy Express*, a utility that allows wildcards during the copy operation.

In the Hardware Hacking topic, Marty Goodman sent us a file describing a bug in the RS-232 Pak and how to fix it. **Bob Smith** (HIBARBAREE) sent us a file describing how to use a Diablo printer with the CoCo, and Robert Pierce sent us a *CoCo Max 3* picture containing a CoCo 3 memory map.

The Games topic includes **Colin McKay** (COLINKCKAY), who uploaded his *Racko* and *Sea Battle* games, and Tom Wyrick, who posted a dart game and a *Wild Party* game.

In the Classic Graphics topic of the database, Tom Wyrick uploaded his graphics editor, and I was busy posting the CoCo Gallery pictures for September '88, as well as those published from October '85 to May '86.

The Music & Sound topic gives us **Mike Carey** (SPOOLFRAME), who uploaded fifteen more of his very popular *Lyra* files, and Mike Stute, who posted two more of his personal favorites.

In the Product Reviews & Announcements topic, Chris Burke uploaded a product announcement for the new Burke & Burke *RSB*. Donald Ricketts posted his review of the CoCo 3 version of *VIP Database*.

In the Data Communications topic, Tom Wyrick uploaded a data communications course composed of several BASIC programs, and a driver package for would-be BBS SysOps. **Robert Combs** (ROBCOMBS) uploaded two versions of *Phone Clone*, one for each model of CoCo 3. Rob also sent us *MultiLink*, a program to link the serial port with an RS-232 pack and enter a CB mode. Donald Ricketts uploaded a patch for *Ultimaterm* to adjust the program for 40-track disks.

program can wreak havoc within your system.

Another hazard, the time bomb, is a program that *blows up* a computer system after a certain interval of time following its installation. A programmer who was fired from a company might leave such a bomb in the system as a form of revenge. These bombs may do relatively simple things (like displaying a clever message on the programmer's birthday), or they may maliciously destroy thousands of important records. Some time bombs will activate themselves at repeatable intervals (like every two or four days after a disk has been infected). The results are varied, but they may include any of the following: printer/display problems, system crashes, or the malfunction of peripherals.

Viruses have been reported for all major brands of computers. Currently, those with IBM compatibles are the most vulnerable, but the potential threat is very real. One factor on our side is that viruses must be specific to the particular machine. (For example, an IBM virus cannot install itself into a CoCo environment.)

In practice, a user is not totally safe unless he never uses his computer. The possibility of a computer viral infection cannot be completely eliminated.

While there are all sorts of infectious agents that can invade your computer, the CoCo is more resistant to such attacks than many other machines. Because the CoCo uses a ROM-based operating system and the system exists as unalterable firmware, permanent change is virtually impossible. This provides a great deal of security for most CoCo users.

The CoCo 3 is a slightly different case since the operating system is transferred to RAM at start-up. This makes it vulnerable to modification by a virus program. It would be rather easy, for example, to patch the CoCo 3's operating system and destroy the allocation tables and/or directory of a disk after a certain time or after a certain number of disk accesses. Fortunately, the CoCo 3's operating system is "refreshed" at each cold start, so a virus couldn't live permanently in this system as it could on other systems.

Those of you using OS-9, however, *are* susceptible to viral infection. Because OS-9 is a disk-based operating system, it is as vulnerable as MS-DOS or any other disk-based operating system. At present, there are no authenticated reports of a CoCo *OS-9 virus*. Much of this can be attributed to the CoCo OS-9 user, who is usually more interested in the operating system itself rather than in childishly damaging someone else's system.

Although real viruses have been created for MS-DOS machines, these are somewhat rare. Generally, when someone *thinks* a problem is due to a virus, it is actually due to software misuse, damaged software or a hardware failure of some sort.

Since viruses can be created to merge with and contaminate the operating system in any of a number of ways, there does not seem to be any practical means of "protecting" our users against possible viruses. All we can do is carefully examine any report of problems that might be associated with a program someone has downloaded from the database. Please notify the SIG staff if you suspect a program may be other than what it appears. We'll all be glad to help out.

See you online on Delphi!

The CoCo XT and CoCo XT-RTC Hard Disk Interfaces

The CoCo XT interface uses advanced "NO HALT" hard disk controllers, which do not halt your CoCo and do not disable or use interrupts during hard disk access. You get full type-ahead, and the system clock does not lose time during hard disk access. Fully compatible with most RS-232 expansion ports!

Great for Multi-User Systems

The CoCo XT hard disk interface lets you connect up to 2 low cost, PC compatible 5-120 Megabyte capacity hard drives to your CoCo. You buy the drive, Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, and a case from the PC dealer of your choice. Just plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and you have a 20 Meg OS9 hard disk system for *under $450!*

We've sold hundreds of these affordable, high-performance hard disk interfaces to a very hot Color Computer market in a single year! This year, 1988, is "The Year of the Hard Disk" at Burke & Burke.

CoCo XT (with anodized housing, 60 page user manual, hard disk back-up utility and new, Version 2.3 drivers for use with both *HYPER-I/O and OS9*) $69.95.

CoCo XT-RTC (same features as the CoCo XT, and includes a real-time clock / calendar with battery backup) -- $99.95

THE PROFESSIONAL TOUCH: XT-ROM -- Automatically boots and reboots OS9 from hard disk. Installs in your hard disk controller's BIOS ROM socket -- $19.95.

HYPER-I/O: BASIC runs hard drives, big floppies, and more!

You or someone that you know may have the 35 Track Blues. It strikes hundreds of CoCo users every year. One day you wake up, and say to yourself, "These 35 track floppy disks are just too small." There's only one cure. More storage. Get it. With HYPER-I/O, from Burke & Burke.

Now compatible with DISTO and LR Hard Disks

HYPER-I/O modifies the RS-DOS Disk BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and RS-DOS software with hard disk interfaces (CoCo XT, DISTO, LR), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, OS9 compatible, EPROM-able HYPER-I/O is becoming the system of choice for the CoCo 1, CoCo 2, and CoCo 3. *HYPER-I/O Version 2.5* now available only $29.95. *HYPER-III* (RAM Disk and Print Spooler for CoCo 3 HYPER-I/O) --$19.95

Check out these OS9 Utilities

Tools to let you spend less time fighting OS9, and more time using it.

Wild & MV Version 2.1 Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! $19.95

EZGen Version 1.04 Powerful OS9 bootfile editor. Change module names, add or delete modules, patch bytes, or rearrange modules. Works on other files, too. $19.95

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ILLINOIS RESIDENTS PLEASE ADD 7% SALES TAX. COD's add $2.20. Shipping (within the USA) $2.00 per CoCo XT; $1.50 per disk or ROM. Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted (312) 397-2898.

RAINBOW CERTIFICATION SEAL

You see the glamour, let me tell you about the work . . .

So You Want to Be a SysOp

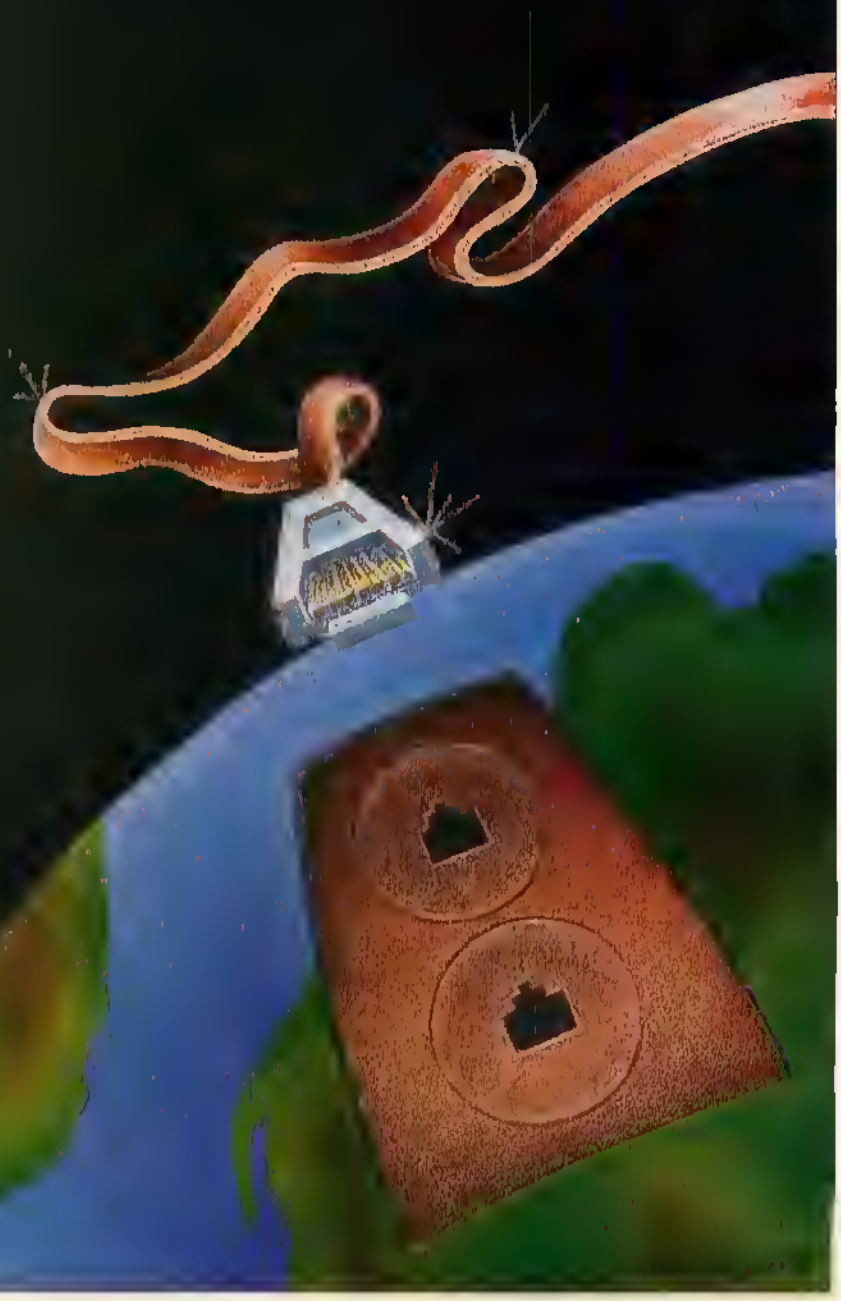
By Dave Jenkins

Many bulletin board users consider becoming a System Operator (SysOp), and some will start BBSs. Often, however, these new SysOps grow discouraged by the unanticipated problems and time demands of a properly running BBS. This article is intended to help the prospective SysOp make an intelligent decision.

As a potential SysOp, you must have the right personality and experience before going online. You need the patience to answer questions from users. Perhaps you've answered that same question a hundred times before, but the person asking doesn't know that. You also need to know how to program, and how to use such things as a disk zapper. A little electronics knowledge can also be helpful.

You should have plenty of spare time — being a good SysOp takes a lot of time. I spend about an hour a day working the system, and an additional two or three hours updating files on Sunday mornings. Because most people don't have a large enough system to adequately run a BBS, you may need to update your equipment, so you'll need some money. You'll also need a second telephone line, which (depending on where you live) can be expensive.

Before you decide to put a BBS online, you should ask yourself if you really want to do this. Don't answer too quickly. Remember



Dave Jenkins is an engineer at WNIN-TV/FM in Evansville, Ind. He has been a System Operator for four years and is BBS section leader on Compu Serve's CoCo Forum.

that your computer will be tied up while the BBS is online. When you want to use the computer, someone will probably be online. If you are into gaming, or use your computer for many other things, you will probably regret starting a BBS.

You must also remember that most areas have several BBSs. If you want to be a success, you must find a need and fill it. Don't duplicate the other BBSs in your area. Find out what is needed in the community and do that. For instance, in my area no BBS supported graphics in a format that several computers could use. I started putting RLE (run length encoded) graphics online. These can be viewed by almost all the popular home computers. This has been very popular, and other BBSs in town have started posting RLE graphics as well. You might also want to offer online games, role playing games, specialized message bases or downloads.

Choosing Hardware and Software

You need to decide what hardware and software to use. If you have a spare computer system sitting around gathering dust, it would be a prime candidate to run your BBS. I don't suggest putting new hardware online until you are certain that it works properly. An online BBS is a poor place to discover manufacturing defects.

If your software supports it, I recommend going with a 300/1200-baud modem. The 1200-baud modems cost less than 300-baud modems did just a few years ago. About one-third of the users on my system are 1200 baud, and more are moving in that direction. (In fact, if your hardware and budget can support it, I would go with 2400-baud service.) You should support at least 300- and 1200-baud modems. Get a fully Hayes-compatible modem. The Hayes command set has become a de facto standard among modems, and it cannot hurt to follow the standard. You may be able to get by without it, but it may hinder a future upgrade. It is cheaper to buy it now than to buy a second modem later.

You can find BBS software in two ways: shop for commercial BBS software or download free BBS software from Delphi or other networks. In either situation, talk to SysOps who use the software for an accurate judgment of the software's quality. Software sold commercially is not necessarily bug-free. Call running BBSs to get a feel for the software from a user's standpoint. No matter how you find the software to run your BBS, it should support Xmodem up- and downloading. Your system will be severely restricted without it.

A good BBS should have at least four drives. Although I have run systems with two drives, and you can start at that point, you should expand to as many drives as possible. No BBS in existence has too much storage space. The more you have, the more you can offer your users. Plan to continue upgrading your system.

A 64K CoCo makes an excellent BBS computer, particularly when it is outfitted with the RS-232 pack. A 512K CoCo 3, which allows two RAM disks online, is also an excellent choice. My system is a 512K CoCo 3 with a Multi-Pak Interface, an RS-232 pack, four floppy drives and an Avatex 1200 modem. My future upgrades will include moving to either double-sided or quad-density disk drives and the OS-9 operating system. The upgrading never ends.

You might want to buy a used system from someone for your BBS. If you can find the right package deal, you can get a system going for a reasonable price

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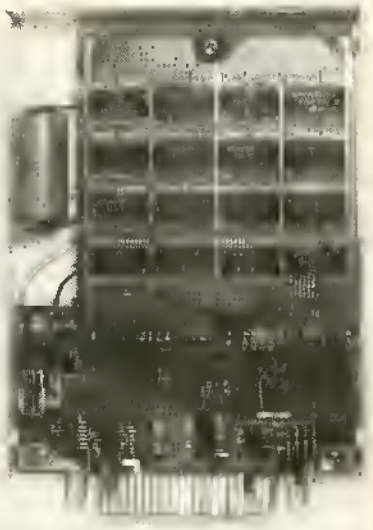

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and keep your CoCo as your main computer. Don't rule out systems from other manufacturers. You might find a great bargain and learn something in the process.

Getting a Telephone Line

Many new SysOps try to begin running their BBS on their residence telephone line. I do not recommend this practice. Some users will ignore or forget your hours of operation and call when the BBS is down. And, while your BBS is online, no one can call you.

Telephone company rules vary widely from area to area. Some companies try to charge BBSs business rates instead of residential rates. Try to get *measured service* for your BBS line. Measured service limits the number of free outgoing calls and adds a surcharge for each call made beyond that number. Since most, if not all, calls will be incoming, this should not be a problem. Please remember that some telephone companies will not allow a measured service line in your home if you also have a standard line.

You can save money on installation if you can do your own interior wiring. Telephone wiring is not difficult. There are several books available that explain how it is done. Our telephone company charges $36 an hour for installation, so it pays to learn how to do your own wiring.

Before going online, you must also decide whether or not your BBS is free to the user. Charging for access creates other considerations. Every subscription BBS SysOp I have talked to has problems with users sharing one password. I know of no solution to this problem except charging for connect time. You will also have to take care of bookkeeping and keep track of subscription expiration dates. If you charge for access, the telephone company may also consider your BBS a business and charge you business phone rates.

Require that callers use their full names online. While handles can be fun, they can create a lot of problems. Most BBSs in my area that allowed handles didn't stay online very long because of troublemakers who hid behind the handle. Requiring full names reduces problems.

Ready to Go Online

Let's assume that you have the hardware and software ready and the telephone line is installed. You're ready to go online. What problems can you anticipate?

First, you can expect hardware problems. Running a BBS puts a heavy strain on your equipment. Expect to have your disk drives aligned and cleaned at least once a year. The drives are the weakest point in your system because they are the only mechanical part. The rest of your system is electronic and should be fairly reliable, unless there is a lightning strike, overheating, or some other severe condition.

Get surge protectors for the power and telephone lines coming into your system. These devices may cost you $50 to $75, but the insurance is worth the investment. If it saves you from just one lightning strike, a surge protector will have paid for itself.

Your computer should not share an electric circuit with a heavy-duty appliance (i.e., your refrigerator, washer or dryer). These devices draw a large amount of current when starting, which reduces voltage and could cause a crash. You might also look into ventilating fans for the computer, especially during the summer in a room without air conditioning. Never cover the ventilation areas while the computer is on.

Unless you absolutely need it on, turn your monitor or TV off while the BBS is in operation. The screen images can *burn into* the CRT. This damage is permanent, expensive to repair and completely avoidable. One SysOp I know bought a used black and white TV to use as a monitor. It made an adequate picture, cost little and was a good choice for the purpose. He left it on all the time, but since it cost so little, he didn't care about raster burn.

A little electronics knowledge can help keep you online. For instance, if parts have visible damage (charring or swelling), knowing how to pull the cover off the equipment, recognize a damaged part and replace it can save you money and keep you online.

Develop a good relationship with the service manager at the nearest Radio Shack Computer Center. If your problem is relatively simple to fix and you bring the unit in for repair, the service manager may expedite the repairs for you. Be subtle when you make such a request. Instead of applying pressure, tell the manager that your BBS is down and that you need your equipment back as soon as possible. If you have a good relationship with the service center (and the shop is not overloaded) your repairs may be moved ahead. Remember, though, we all feel that our repairs are top priority, and sometimes we may have to accept the wait.

Preventive maintenance is also important. Every week, you should clean your edge connectors and your drive heads to prevent corrosion. Radio Shack chose not to use gold edge connectors. You'll need to turn off everything, take the disk controller apart and clean all the edge connectors by rubbing them gently with a pencil eraser. Do the same on the back of your drives. Clean your drive heads with a wet head-cleaning system. (The dry cleaners are abrasive and their use will shorten head life considerably.)

Protecting Yourself From Trouble

You have certain legal obligations as a SysOp. You are responsible for the messages posted on your BBS. Two SysOps in my area were convicted for allowing telephone access codes to be posted. Not only did they face jail sentences, they also had to pay thousands of dollars in legal bills and had to pay the telephone company involved $3,000 in restitution. Unless you like the idea of going to jail for your hobby, avoid posting credit card numbers and telephone access codes.

If you decide to post downloads, only post software and material that you *know* are either public domain or freeware. You may not post any of the following: software from magazines like THE RAINBOW, commercial software and copyright software not authorized to be posted by the author. Many people believe that if they download something from another BBS, they may post it on their own system. That is *not* true. It is entirely possible that a SysOp could be held responsible for lost sales if software is illegally posted. The risks involved are not worth the effort. Do not post anything uploaded to your BBS until you are sure you have the right to do so.

When uploading, watch for a Trojan horse. This is software disguised as one thing that is designed to do another — usually erase your disks. I have not run into this problem in the CoCo BBSs, but there are some nasty programs floating around the MS-DOS world. Test the upload thoroughly before posting it. Don't post anything that you have not personally run, unless you are confident of the source.

If you wish to post a file from one of the commercial online services (like Delphi) check with the service in question regarding its policies. If it finds that you are violating its rules, your membership can be revoked.

Try to establish friendly relations with other local SysOps. In our area, we

have formed a Council of SysOps. The purpose is to share information on problem users. In extreme instances, a user could be booted off every member system in town. We have no actual meetings. One of the boards has a message base restricted to SysOps, and we share information there. Don't war with other SysOps, if it can be avoided. Cooperation can help everyone.

I don't have a hard and fast rule about verifying users. My area doesn't have many problem users, (and the Council of SysOps keeps everyone informed about troublemakers) so I don't voice-verify unless something raises my suspicions. All users must leave their full names and addresses to gain access. Of course, someone could leave a phony name and address, and unless you verify you won't know.

You should make daily backups of your online disks. Sooner or later you will have a disk crash. I had a power line surge that wiped out all my online disks. Fortunately, I had backups from the previous night, so I went to those and left a message about "stepping into the BBS zone, moving back in time to yesterday." It is bad enough to have to use your backups, but it is embarrassing if your backups are a few days — or even weeks — old. Before going to bed, back up your disks. It is not a matter of *if* you will have a crash, but *when*. You will have a disk crash sooner or later.

Disks wear out. You can save a few pennies by buying bulk disks, but I have found that many of these wear out quickly. Computers are such popular items that discount stores often sell brand-name disks for as low as $6 per box of 10. Try to determine an average time that a disk will last on your system. Then, as a normal part of operations, replace your online disks *before* that time. For instance, if disks last eight weeks, replace them every six weeks. Keep the replaced disk for other things, but not for online use.

You may also run into a system crasher. Security is a function of software, but some BBS programs have *back doors* that allow someone to avoid the usual security. These back doors should be eliminated entirely. I am using the *CoBBS* system, which turns off the modem if BASIC is entered. I have also disabled all disk commands that are not used (such as DSKINI, DOS, DSKO$, SAVE, COPY, BACKUP and DIR). Even if users could get through to BASIC, they still could not read any files or even see a directory. Keep in mind, however, that no system is completely secure. Your best insurance against destruction is still frequent backups.

A Few Final Tips

If you are still interested in running a BBS, I have a few suggestions that should make the responsibility a little easier. First, don't underestimate the intelligence of your users. They deserve your respect. Second, if you're going to take the BBS down to do something else on your computer, take the BBS phone off the hook and restrict your use to an hour or so. Incoming callers will get a busy signal (which indicates that the BBS is in use) instead of a ring with no answer (which indicates that the BBS is down). Third, keep in touch with the other BBSs in your area. Call them frequently, and read their message bases to find out what is on people's minds. Finally, have fun. □

(Questions or comments concerning this article may be directed to the author at 1418 E. Illinois St., Evansville, IN 47711. Please enclose an SASE when requesting a reply.)

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Reading for detail

You Can't Get There From Here

By Steve Blyn
Rainbow Contributing Editor

Many people do not realize that truly good readers train themselves to adjust their reading speed to suit each reading situation. Flexibility in approaching different kinds of reading materials requires training *and practice*. Like the driver of a manual-transmission automobile, a reader must learn to shift speeds at appropriate times.

A good reader learns to read faster when skimming and slower when reading for details. When skimming material, good readers do not read every word. They concentrate on reading for the thought or the main idea rather than on the indiviual words. Good readers also know that they must slow down their reading speed when details and concentration on the material are demanded. Words must be studied for their meaning; passages may have to be reread.

This month's article presents a reading exercise suitable for middle school to adult education students. Its concept and appeal are important at all stages of life, and the exercise affords practice in careful, detailed reading of a short passage.

The short story presented below requires slow, careful reading. In this age of fast food and instant anything, students often want immediate results from everything they do. It would be difficult to skim the passage below and come up with a suitable map of the story details. The story is constructed to force students to slow down and read the story carefully.

The following are the directions for this exercise and the passage to be read by the user:

Read the following short story carefully. Try to visualize the route of the car. Then draw a rough map of the route showing the landmarks that were mentioned.

Last weekend, we were driving north through a small, unfamiliar town. It was lunch time and we were getting hungry. We knew that in this town, there was a wonderful pizza restaurant on Main Street. We asked a young lady how to get there, and she gave us the following directions:

"You are now going in the wrong direction. You will be able to make a U-turn two blocks up this street. Then go south on this street until you pass a library on your left. Three blocks later, you will see a gas station on your right. Make a left turn at the next intersection. Go on for about twelve blocks until you reach the first traffic light. The road forks at the light. Take the right fork. Keep going until you reach the next crossroads. You will see a school on your left. Turn right at the crossroads, before you reach the school. You will then be on Main Street. The restaurant will be on your left a few blocks down the street."

Our program presents a low-resolution map of the story and illustrates the route that the car should take. On the left of the screen is a guide for counting the number of streets or blocks indicated.

Run the program after the student has read the story and produced a map. The computer screen is compared to the student's representation. The student should use this comparison to learn why any mistakes were made. Students may want to reread the passage after comparing their maps to the computer representation.

Have your students repeat the program after several days. You can then compare the results of the newly created map with the original. While slow, careful reading is not easily accomplished in our fast-paced society, results *should* improve with each succeeding session.

Use this program to produce other practice passages for your children or students. Alter some of the directions and make the necessary changes in the program for the new map. Better still, try to create a new town map with its own directions. We hope that you and your students enjoy and benefit from this program. See you next month. □

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: MAPPER

```
1Ø REM"VISUALIZING WHAT YOU READ
"
2Ø REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1988"
3Ø CLSØ:PRINT@15,"N";
4Ø FOR T= 1Ø24 TO 153Ø STEP 32:P
OKE T,2Ø9:NEXT T
5Ø PRINT@73,"CAR";
6Ø PRINT@168,"LIBRARY";
7Ø PRINT@258,"GAS";
8Ø PRINT@24Ø,"LIGHT";
9Ø PRINT@375,"SCHOOL";
1ØØ PRINT@497,"PIZZA";
11Ø PRINT@398,"MAIN";:PRINT@43Ø,
"ST";
12Ø FOR T=1Ø96 TO 1Ø32 STEP-32:P
OKE T,241:PLAY"L3Ø;C":NEXT T
13Ø POKE 1Ø31,241
14Ø FOR T=1Ø3Ø TO 1286 STEP 32:P
OKE T,241:PLAY"C":NEXT T
15Ø FOR T=1287 TO 1298:POKE T,24
1:PLAY"C":NEXT T
16Ø FOR T=1298 TO 14ØØ STEP 33:P
OKE T,241:PLAY"C":NEXT T
17Ø FOR T=1247 TO 152Ø STEP 3Ø:P
OKE T,241:PLAY"C":NEXT T
18Ø EN$=INKEY$:IF EN$=CHR$(13) T
HEN CLS:END:ELSE 18Ø
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Making a list? Checking it twice? Before you send it off to the North Pole you should check out our holiday shopping guide. If you've been very, very good, you might want to treat yourself (or a deserving fellow CoCoist) to some of the goodies — ranging from $7.95 to $699.95 — featured here.

(See Page 118 for ordering information.)

Rainbow's Holiday Shopping Guide

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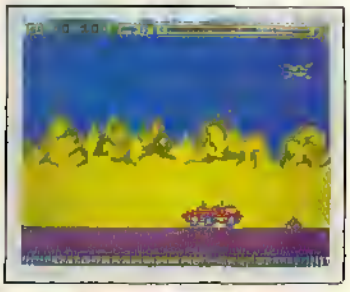
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CoCo 1 and 2

[1] Have a blast from the past with *Speed Racer*. Racer X, eat your heart out! From MichTron, on cassette and disk, $34.95. (Also works on the CoCo 3.)

[2] Can King William *never* rest? Join him in a trilogy of Adventures from RTB Software for the CoCo 1 and 2 only — *Labyrinth* ($24.95), *Quest for the Ring* ($34.95) and *Adventure in Lumeria* ($36.95). Here he is at the beach, attempting to cross the sea to save his lady fair.

[3] Go lunar and drive for yourself an out-of-this-world set of wheels with *Moon Runner*. It's arcade action in orbit. (*Psst!*, also included is a version especially for the CoCo 3.) From Nick Bradbury, disk system only, $15.

[4] Deliver the ultimate parting shot with *Car Sign Designer*. The package comes with two reusable sign holders. From Zebra Systems for 64K CoCo 1, 2 and 3 disk systems, $29.95.

[5] Are you fumble-fingered? Is your wimpy wpm getting you down? Here's the cure — *TypeMate*, a typing tutor on a ROM pack from Tandy (also works on the CoCo 3). Available in Radio Shack stores nationwide for $24.95.

[6] Get a handle on CoCo 1, 2 and 3 data storage with Burke & Burke's *Hyper-I/O* ($29.95), a program that allows the use of 3½-inch floppy drives and hard drives under Disk BASIC *and* OS-9.

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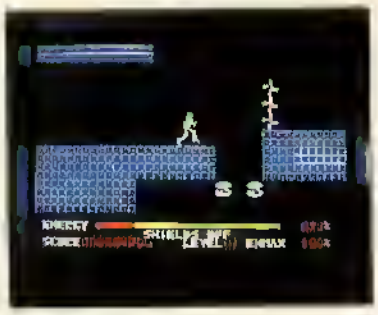

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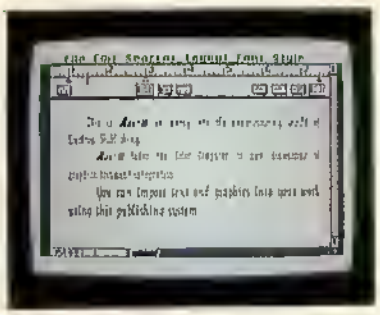

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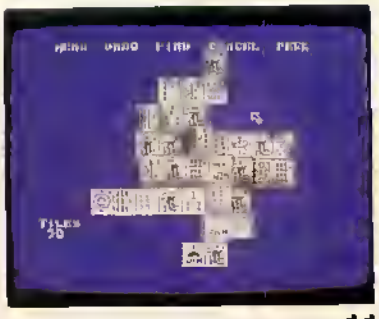

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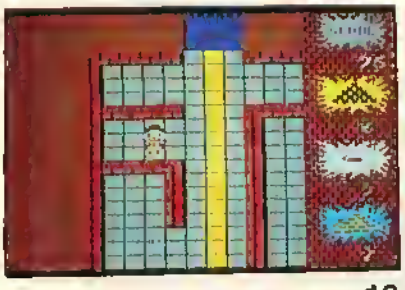

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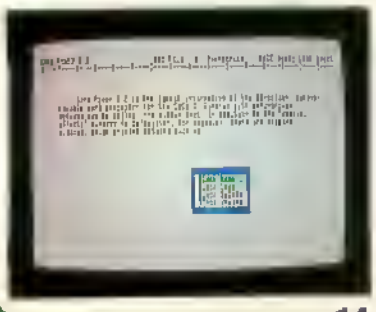

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CoCo 3

[7] Trigger happy? Our Business Assistant, Dawn Cecil, is. Here she is taking potshots at the screen with the *Iron Forest* phaser. If you feel you're up to zapping a few monsters in the mission to protect a sacred white dove, this game is for you. (The graphics and sound effects are great!) From Diecom Products for disk systems only: $29.95 U.S., $37.95 CDN; with phaser and interface, $74.95 U.S., $93.95 CDN.

[8] *Thexder* is the Number 1 arcade hit from the Land of Sushi and the Rising Sun. If you're into Transformers, you should like this game. From Sierra On-Line, available in Radio Shack stores everywhere, $24.95.

[9] Integrate text and graphics and dabble in new dimensions of desktop publishing with *Max-10*. It's menu-driven and requires a disk drive and a Hi-Res joystick or mouse. From Colorware, $79.95 plus $3 S/H.

[10] Feel like questing? Then go seek ye the Phoenix Crossbow in Sundog Systems' *In Quest of the Star Lord* ($34.95 plus $2.50 S/H). Requires disk drive.

[11] Based on the ancient game of mah-jongg, *Shanghai* is a brain-teaser for those who don't give up easily. It's on a ROM pack from Activision for $34.95: Available in Radio Shack stores nationwide.

[12] Ever get the feeling you're lost in a maze and being chased by ugly monsters? Perhaps you've been playing *A Mazing World of Malcolm Mortar* in your sleep. On a ROM pack from Tandy for $29.95: Available in Radio Shack stores nationwide.

[13] Dive into a mouse- and menu-driven programming environment for Enhanced Color Disk BASIC with *Window Master*. It requires 512K and adds more than 50 commands and functions to CoCo 3's BASIC. From Cer-Comp, $69.95 plus $3 S/H.

[14] If you're in the market for 80-column, menu-driven CoCo 3 word processors, you might check out *Word Power* 3.2, which features a print spooler, spelling checker and split-screen editing. From Microcom Software, $79.95.

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Hardware

[15] You might want to hold off on that new floppy drive you're planning to buy — Arizona Small Computer Peripherals is selling full-height hard drive kits that come with drive, SASI controller, power supply and cables. You supply the case and interface. Available in 5-Meg ($120), 8-Meg ($140) and 10-Meg ($160) models. As a bonus, some public domain software is included. The drive shown here is in a case and has a controller attached.

[16] Here's a trio of goodies for any serious computer buff. CRC/Disto's Super Controller II ($130) offers souped-up I/O and extra care for OS-9 operations. The EPROM programmer ($54.95) can attach to the Super Controller and "burn in" favorite utilities. The RS-232 SuperPack ($49.95 — requires Multi-Pak) offers CoCoists an RS-232 serial port.

[17] If it's a self-centering joystick you want, here it is, the ComMander Deluxe Joystick — with its four firebuttons for lefties and righties both. The joystick was designed for other computer systems but has been modified by CRC/Disto for the CoCo's joystick ports. From CRC/Disto, $29.95.

[18] You ought to be in pictures. And if you have a CoCo 3, a video camera, disk drive and a Multi-Pak — you can be. The DS-69B Digisector pack shown here with our Customer Service Manager, Beverly Bearden, is sold by The Micro Works and costs $149.95.

[19] Oh say, how cheaply can you see with this 12-inch, 80-column-capable green-screen monochrome monitor? Only $67.50 plus $7 S/H. Sold by Howard Medical Computers.

[20] If you have data that's too important to lose, spring for Solid Drive, a static RAM disk that write-protects itself on power loss. It includes OS-9 and Disk BASIC device drivers and requires a Multi-Pak. From Vidicom Corp., available in 512K ($395) or 1-Meg ($695) version.

[21] How about it, CoCo 1 and 2 users? Here's the ultimate upgrade — Tandy's 128K Color Computer 3 ($129.95) and a CM-8 RGB monitor ($299.95) to take advantage of its native 64 colors and 80 columns, and an FD 502 single disk drive ($199.95). See what memory and Hi-Res graphics can do.

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Accessories

[22] Here's an assortment of accessories to make the computing life a little easier. The DM-8 printer stand from Datum Manufacturing ($14.95) allows anxiety-free printer relations; tractor-feed paper can be stored snag-free underneath. The Curtis Copy Clip ($6.95), a reversible copy holder from Curtis/PCA, keeps your eyes monitor-level; it attaches to the monitor with velcro and folds back out of the way when not in use.

[23] Don't let one bump in the night cost you $$$$ — get an MPI-CoCo Locking Plate from Gimmesoft ($7.95) and keep your CoCo 3/Multi-Pak connections solid. Comes in two styles.

[24] The ultimate off-line utility — *DELPHI: The Official Guide* — will get you acquainted with every aspect of the Delphi online information service in its 488 pages. From Simon & Schuster, $21.95.

[25] The MS-500 monitor stand from Datum Manufacturing ($17.95) saves desktop space and adds a touch of class to your CoCo setup.

[26] Set your own style with Foto-Wear!'s iron-on transfer paper. Print a graphic using a color printer — or color a black-and-white printout with crayons — and iron it onto a cotton garment. This T-shirt shows the possibilities. Four-transfer pack, $9.95; 10-transfer pack, $19.95.

[27] A gift subscription to THE RAINBOW and RAINBOW ON TAPE or DISK is a gift that keeps giving the whole year round. RAINBOW's OS-9 books, the binders, the Adventure books and other entries in the RAINBOW Library make nice gifts, also. See pages 10, 12, 24, 50, 51 and 112 for more information on ordering these items.

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Wall Street comes to your CoCo screen with this game of luck and skill in buying and selling stocks

Playing the Stock Market

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By Mark Webb

Stock Ticker is a Simulation game of buying and selling stocks, collecting dividends and becoming wealthy. There are two versions of the program. Listing 1, STOCKS3, will work on any CoCo 3 with 128K, an RGB monitor and one joystick. Listing 2, STOCKS2, will run on the CoCos 1 and 2 and requires at least 16K ECB of memory.

STOCKS3, the CoCo 3 version, is menu-driven and uses the right joystick to execute commands. STOCKS2, the CoCo 1 and 2 version, uses the following keys for game play:

H	Help Screen
C	Original buy for playing against the CoCo (HAL)
A	Autoroll
S	Sell stocks
Q	Quit Autoroll
B	Buy stocks
Space bar	Roll (single)

Also, in the CoCo 1 and 2 version: Pressing the up-arrow key allows the next player to buy stocks without rolling and affecting the stock values. This allows each player to buy stocks at the same price and can only be used at the beginning of the game. If you are playing against the CoCo (called "HAL" and only available in the CoCo 1 and 2 version), press C when it is CoCo's turn to do the initial buying.

The available stocks are as follows:

GO = Gold
SI = Silver
OI = Oil
BO = Bonds
IN = Industrial
GR = Grain

CoCo 3 version only:
FO = Forestry
SP = Space

Both versions of *Stock Ticker* are designed for up to four players. The object of the game is to buy and sell stocks so that you accumulate more wealth by the end of the game than any other player. Each player begins the Simulation with $10,000 and may purchase stock at the start of the game at par value (e.g., $2,000 will buy 2,000 shares of any stock at the start of the game.) It is not necessary to spend all of your money at once, though after the first player rolls, the prices may change. However, you can buy and sell any time it is your turn. An Autobuy feature is included which can be used to buy stocks for you automatically when you have enough money. By using Autobuy, you can select any of the stocks you want it to buy for you. You can even select *all* the stocks, sit back and watch your money roll in! Stocks can be "turned on" or "off" as many times as you want when it is your turn. The Roll option will roll just once for you and then stop. Autoroll will keep rolling until the joystick button is pressed on the CoCo 3 version or Q is pressed on the CoCo 1 and 2.

The computer sounds a notice when a stock has declared a dividend and is at or above par value of 100. At this point players are paid a dividend amount depending upon how many shares of that stock they own. If a stock rises above 200, all players holding shares in it are granted a two-for-one split, and the stock is restored to a par of 100. If a stock crashes, or falls below zero, then players unfortunate enough to be holding that stock lose all their shares of it.

The game ends when the number of rounds winds down to zero. When that occurs, the computer calculates each player's gross worth at game's end and displays it on the screen. A 500-round game can be played in 45 minutes to an hour.

(Questions or comments concerning these programs may be addressed to the author at P.O. Box 793, Gold River, B.C., Canada V0P 1G0. Please enclose an SASE when requesting a reply.) □

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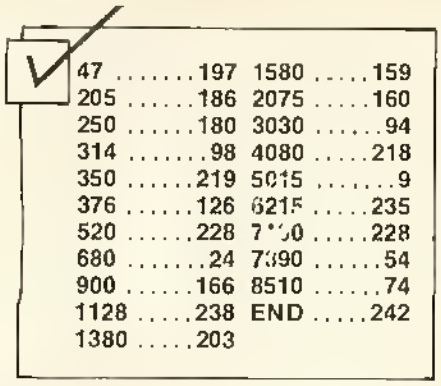
Mark Webb is a computerist by both vocation and avocation. He runs the chemical-plant computer at a Canadian pulp mill and, after hours, programs his CoCo 1 and 3.



```
47 .....197 1580 .....159
205 .....186 2075 .....160
250 .....180 3030 .....94
314 .....98 4080 .....218
350 .....219 5015 .....9
376 .....126 6215 .....235
520 .....228 7?50 .....228
680 .....24 7890 .....54
900 .....166 8510 .....74
1128 .....238 END .....242
1380 .....203
```

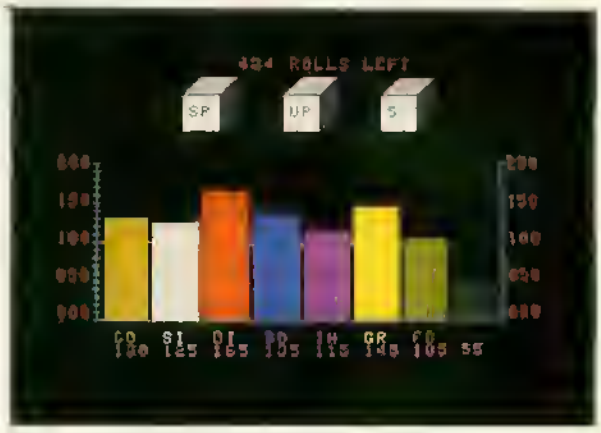
Listing 1: STOCKS3

```
Ø 'stockticker 88 (C)
1 'by mark webb
2 '
3 'COMPLETED MARCH 1988
4 '
5 'BOX 793
6 'GOLD RIVER B.C.
7 'CANADA
8 'VØP-1GØ
9 '
1Ø POKE65497,Ø
15 CLEAR5ØØ
2Ø CLSØ
3Ø DIM X,Y,JØ,Y1,P,N$(4),SV(8),O
V(8),M(4),S$(8),SL$(8),S(4,8),P1
(15),P2(15),T$(9),A$,B$,C$,D$,E$
(3),U,AB(4,8),Z
35 U=1
4Ø FORX=1 TO 8:SV(X)=1ØØ:OV(X)=Ø
:NEXTX
41 T$(6)="BR1BU1F1R4NE1L2U8R2NF1
L4G1BD7BR6"
42 T$(7)="BR1NR4U4NR3U4R4BD8BR2"
43 T$(8)="U8R2F1D2G1L2R1F2D2BR2"
44 T$(9)="BR1R2E1U2H4U2E1R2F1D2G
4D2F1BR6"
45 T$(1)="BR1NH1R3E1U2H1L3H1U2E1
R3F1BD7"
46 T$(2)="BR3E1NF1U7L2NG1R4F1BD7
"
47 T$(3)="BR2NR3U1H1U4E1U1R3D1F1
D4G1D1"
48 T$(4)="BR4R2NE1L2H1U6E1R2F1BD
7BR2"
49 T$(5)="U8D4R1F2ND2H2E2U2BD8BR
1"
5Ø FORX=1 TO 4:M(X)=1ØØØØ:NEXTX
52 E$(1)="UP":E$(2)="DN":E$(3)="
DV"
55 DATA Ø,7,Ø,Ø,Ø,Ø,Ø,Ø,Ø,11,33,
2Ø,47,55,52,Ø
56 FORX=Ø TO 15:READP2(X):NEXTX
57 POKE&HE6C6,18:POKE&HE6C7,18
6Ø DATA Ø,48,63,38,9,4Ø,54,17,7,
24,46,5,1,2,56,59
7Ø FORX=Ø TO 15:READP1(X):NEXTX
8Ø FORX=Ø TO 15:PALETTEX,P1(X):N
EXTX
9Ø DATA GO,SI,OI,BO,IN,GR,FO,SP
1ØØ FORX=1 TO 8:READ S$(X):NEXTX
1Ø1 DATA GOLD,SILVER,OIL,BONDS,I
NDUSTRIAL,GRAIN,FORFSTRY,SPACE
1Ø2 FORX=1 TO8:READSL$(X):NEXTX
11Ø GOTO5ØØØ
2ØØ '8Ø column screen setup
2Ø1 HSCREENØ:WIDTH8Ø
2Ø2 CLS1
2Ø3 POKE&HEØ47,Ø
2Ø5 FORX=Ø TO 15:PALETTEX,P2(X):
NEXTX
2Ø6 ATTR5,Ø:LOCATE23,Ø:PRINT"* *
 * * STOCKTICKER 88 * * * *";:AT
TR1,Ø
2Ø7 FORX=Ø TO 3:LOCATE1+X*2Ø,2:P
RINT N$(X+1);:NEXTX
2Ø8 FORX=Ø TO 3
2Ø9 FORY=1 TO 8
21Ø LOCATE1+X*2Ø,2+Y:PRINT S$(Y)
;" - Ø";
211 NEXTY,X
212 FORX=Ø TO 7
213 ATTR3,Ø:LOCATE2+X*1Ø,12:PRIN
T S$(X+1);"=";SV(X+1);
214 NEXTX
215 ATTR2,Ø
216 FORY=Ø TO 3
217 FORX=Ø TO 3
218 LOCATE2+X*2Ø,14+Y
219 PRINT S$(Y+1);"  ";S$(Y+5);
22Ø NEXTX,Y
221 ATTR4,Ø
222 LOCATE3,19:PRINT"BUY";
223 LOCATE18,19:PRINT"SELL";
224 LOCATE34,19:PRINT"ROLL";
225 LOCATE5Ø,19:PRINT"AUTOROLL";
226 LOCATE68,19:PRINT"AUTOBUY";
227 ATTR1,Ø
228 RETURN
25Ø '8Ø column screen update
251 HSCREENØ:FORX=Ø TO 15:PALETT
EX,P2(X):NEXTX
252 ATTR1,Ø,U:FORX=Ø TO P-1:LOCA
TE1+X*2Ø,2:PRINTN$(X+1);:NEXTX
254 ATTR3,Ø,B:LOCATE1+(U-1)*2Ø,2
:PRINTN$(U);
256 ATTR4,Ø:FORX=1 TO P:LOCATE7+
(X-1)*2Ø,2:PRINTUSING"$$#######"
;M(X);:NEXTX
258 FORX=Ø TO 3
26Ø FORY=1 TO 8
262 LOCATE5+X*2Ø,Y+2:PRINTS(X+1,
Y);
264 NEXTY,X
266 LOCATE32,21:PRINTNR;"ROLLS L
EFT";
268 FORX=Ø TO 7
27Ø LOCATE5+X*1Ø,12:PRINTSV(X+1)
;
```

```
272 NEXTX
298 RETURN
3ØØ 'joystick input here
31Ø JØ=JOYSTK(Ø):JØ=INT(JØ/12)
311 FORX=1 TO 88:NEXTX:IFJØ=Ø TH
EN JØ=1
312 ATTR3,Ø:ONJØ GOSUB32Ø,322,32
4,326,328
313 FORX=Ø TO 88:NEXTX
314 ATTR4,Ø:ONJØ GOSUB32Ø,322,32
4,326,328
316 IF BUTTON(Ø)=1 THEN SOUND RN
D(255),1:GOTO33Ø ELSE31Ø
32Ø LOCATE3,19:PRINT"BUY";:RETUR
N
322 LOCATE18,19:PRINT"SELL";:RET
URN
324 LOCATE34,19:PRINT"ROLL";:RET
URN
326 LOCATE5Ø,19:PRINT"AUTOROLL";
:RETURN
328 LOCATE68,19:PRINT"AUTOBUY";:
RETURN
33Ø ON JØ GOTO335,37Ø,4ØØ,43Ø,45
Ø
334 'buy main
335 GOSUB34Ø:GOTO354
34Ø 'buy & sell subroutine
341 ATTR3,Ø:A$=STRING$(4Ø," ")
342 LOCATE32,21:PRINT"HOW MANY S
HARES?";:PLAY"T128V31L64O1CECECO
4EFGO5GGFG"
343 JØ=JOYSTK(Ø):NS=(JØ+1)*5ØØ
344 LOCATE49,21:PRINT"     ";
345 LOCATE49,21:PRINTNS;:FORX=1T
O111:NEXTX
346 IF BUTTON(Ø)=1 THEN348
347 GOTO343
348 PLAY"O3CGCGCGEFDGEFDGEGGGGEF
FFFFEDDDO1GDFEGCCC":LOCATE32,22:
PRINT"OF WHICH STOCK?";
349 JØ=JOYSTK(Ø):ST=INT((JØ+4)/8
):IFST<1 THEN ST=1
35Ø LOCATE49,22:PRINT"
";
351 LOCATE49,22:PRINT SL$(ST);
352 IF BUTTON(Ø)=1 THEN RETURN
353 GOTO349
354 IF NS*SV(ST)/1ØØ>M(U) THEN35
5 ELSE36Ø
355 LOCATE2Ø,21:PRINTA$:LOCATE2Ø
,22:PRINTA$;
356 LOCATE32,21:PRINT"NOT ENOUGH
 MONEY!";
357 SOUND18Ø,2:FORX=1 TO 667:NEX
TX
358 LOCATE32,21:PRINT"
      ";
359 GOTO362
36Ø LOCATE2Ø,21:PRINTA$;:LOCATE2
Ø,22:PRINTA$;:M(U)=M(U)-NS*SV(ST
)/1ØØ
361 S(U,ST)=S(U,ST)+NS
362 GOSUB25Ø:GOTO3ØØ
363 '*************************
37Ø 'sell main
372 GOSUB34Ø
374 IF NS>S(U,ST) THEN376 ELSE38
6
376 LOCATE2Ø,21:PRINTA$;:LOCATE2
Ø,22:PRINTA$;
378 LOCATE32,21:PRINT"NICE TRY E
H!";
38Ø FORX=1 TO22:PLAY"T255L128O3F
FGGFFGGF":NEXTX
382 LOCATE32,21:PRINT"
  ";
384 GOTO395
386 M(U)=M(U)+NS*SV(ST)/1ØØ
39Ø S(U,ST)=S(U,ST)-NS
392 LOCATE2Ø,21:PRINTA$;:LOCATE2
Ø,22:PRINTA$;
395 GOSUB25Ø:GOTO3ØØ
397 '*************************
4ØØ 'roll once
41Ø GOSUB8ØØØ:GOSUB3ØØØ
411 U=U+1:IFU>P THEN U=1
412 GOSUB25Ø
42Ø GOTO3ØØ
425 '************************
43Ø 'autoroll
431 AR=88
432 GOSUB8ØØØ:GOSUB3ØØØ
433 U=U+1:IFU>P THEN U=1
434 IF BUTTON(Ø)<>1 THEN432
436 AR=Ø:FORX=Ø TO 15:PALETTEX,Ø
:NEXTX:GOSUB25Ø:GOTO3ØØ
44Ø '************************
45Ø 'autobuy main
455 GOSUB85ØØ
46Ø GOTO 3ØØ
5ØØ 'how many players routine
52Ø HCOLOR1Ø,1Ø
53Ø HPRINT(11,5),"HOW MANY PLAYE
RS?"
54Ø FORX=Ø TO 3
55Ø HCOLOR8,8:HLINE(56+X*56,84)-
(56+(X*56)+32,64),PSET,BF
56Ø HCOLOR14,14:HLINE(57+X*56,83
)-(55+(X*56)+32,65),PSET
57Ø HLINE(6Ø+X*56,68)-(52+(X*56)
+32,8Ø),PSET,BF
575 HLINE(57+X*56,65)-(55+(X*56)
+32,83),PSET
58Ø HCOLORØ,Ø:HLINE(6Ø+X*56,68)-
(52+(X*56)+32,8Ø),PSET,B
59Ø NEXTX
61Ø HDRAW"BM68,77;S4;CØ;R6L3U6R3
L6"
62Ø HDRAW"BM124,77;R6L4U6L2R5NR2
D6R2"
63Ø HDRAW"BM179,77;NR8R2NU5R2NU5
```

```
R2U6R2L8"
64Ø HDRAW"BM235,77;NR12R2U6L2NR1
2R4D4F2R2E2U3"
65Ø JØ=JOYSTK(Ø):JØ=INT(JØ/16)
66Ø HCOLOR4,Ø
67Ø HLINE(55+JØ*56,85)-(89+JØ*56
,63),PSET,B
68Ø IF BUTTON(Ø)=1 THEN BP=77 EL
SEBP=Ø
69Ø HLINE(55+JØ*56,85)-(89+JØ*56
,63),PRESET,B
7ØØ IF BP=77 THEN 71Ø ELSE 65Ø
71Ø PLAY"T255L128O1FFGFFGDFFD"
72Ø P=JØ+1
73Ø RETURN
749 'BACKGROUND FOR # PLAYERS
75Ø HCOLOR8,Ø
755 HCLSØ
76Ø FORX=Ø TO 319 STEP6
77Ø HLINE(X,Ø)-(X,191),PSET
78Ø NEXTX
79Ø FORY=Ø TO 191 STEP 4
8ØØ HLINE(Ø,Y)-(319,Y),PSET
81Ø NEXTY
82Ø FORX=Ø TO 8
83Ø HLINE(X,X)-(319-X,191-X),PSE
T,B
84Ø NEXTX
85Ø HDRAW"BMØ,Ø;CØ;F8;BM319,Ø;G8
;BMØ,191;E8;BM319,191;H8;"
86Ø FORX=11 TO 3Ø9 STEP32
87Ø HSET(X,4,15):HSET(X,5,15):HS
ET(X+1,4,14):HSET(X+1,5,14)
872 HSET(X,187,14):HSET(X,188,14
):HSET(X+1,187,15):HSET(X+1,188,
15)
88Ø NEXTX
89Ø FORY=11 TO 18Ø STEP24
9ØØ HSET(4,Y,15):HSET(4,Y+1,15):
HSET(5,Y,14):HSET(5,Y+1,14)
91Ø HSET(315,Y,15):HSET(315,Y+1,
15):HSET(316,Y,14):HSET(316,Y+1,
14)
92Ø NEXTY
99Ø RETURN
999 'graph update subroutine
1ØØØ FORX=1 TO 8
1Ø1Ø IF SV(X)=OV(X) THEN112Ø
1Ø2Ø IF SV(X)>OV(X) THEN 1Ø3Ø EL
SE1Ø8Ø
1Ø3Ø FORY=OV(X) TO SV(X)
1Ø4Ø HCOLORX:Y1=INT(Y/2)
1Ø5Ø HLINE(2+X*32,168-Y1)-(3Ø+X*
32,168-Y1),PSET
1Ø6Ø NEXTY
1Ø7Ø GOTO112Ø
1Ø8Ø FORY=OV(X) TO SV(X) STEP-1
1Ø9Ø HCOLORØ,Ø:Y1=INT(Y/2)
11ØØ HLINE(2+X*32,168-Y1)-(3Ø+X*
32,168-Y1),PRESET
111Ø NEXTY
112Ø NEXTX
1125 FORY=1 TO 8:OV(Y)=SV(Y):NEX
TY
1126 HCOLOR3,Ø:HLINE(112,Ø)-(144
,8),PRESET,BF:HPRINT(14,Ø),NR-1
1127 HCOLOR9,Ø:HLINE(28,168)-(29
2,168),PSET
1128 HCOLOR1Ø,Ø:HLINE(4Ø,184)-(2
88,191),PRESET,BF
1129 FORX=1 TO 8:HPRINT(4*X,23),
SV(X):NEXTX
113Ø NR=NR-1
1131 IF NR=Ø THEN 6ØØØ
1132 IF AR=88 THEN114Ø
1135 FORX=Ø TO15:PALETTEX,Ø:NEXT
X
114Ø RETURN
1199 'graph set up subroutine
12ØØ HCLS
121Ø HCOLOR9,Ø
122Ø HLINE(28,68)-(28,168),PSET
123Ø HLINE-(292,168),PSET
124Ø HLINE-(292,68),PSET
125Ø HLINE(28,118)-(292,118),PSE
T
126Ø FORX=168 TO 68 STEP-5
127Ø HLINE(26,X)-(3Ø,X),PSET
128Ø HLINE(29Ø,X)-(294,X),PSET
129Ø NEXTX
13ØØ FORX=1 TO 8
131Ø HCOLORX,Ø
132Ø HPRINT(1+4*X,22),S$(X)
133Ø NEXTX
134Ø HCOLOR8,Ø
135Ø D$="NR24U24NE12R24E12NL24G1
2D24E12U24"
136Ø HDRAW"BM84,48;XD$;BM148,48;
XD$;BM212,48;XD$;"
137Ø FORX=Ø TO 2
138Ø HPAINT(86+X*64,46),2,8
139Ø HPAINT(11Ø+X*64,44),8,8
14ØØ HPAINT(88+X*64,22),14,8
141Ø NEXTX
1415 HCOLOR3,Ø:HPRINT(18,Ø)," RO
LLS LEFT"
1416 HCOLOR3,Ø:HPRINT(Ø,8),"2ØØ"
:HPRINT(Ø,11),"15Ø":HPRINT(Ø,14)
,"1ØØ":HPRINT(Ø,17),"Ø5Ø":HPRINT
(Ø,2Ø),"ØØØ"
1417 HPRINT(37,8),"2ØØ":HPRINT(3
7,11),"15Ø":HPRINT(37,14),"1ØØ":
HPRINT(37,17),"Ø5Ø":HPRINT(37,2Ø
),"ØØØ"
142Ø RETURN
15ØØ 'number of rounds routine
151Ø HCLS8
152Ø FORX=Ø TO 158 STEP 8
153Ø Y=X:IFY>191 THEN Y=191
154Ø HCOLOR4,Ø
155Ø HLINE(X,Y)-(319-X,191-Y),PR
ESET,B
```

```
1555 HLINE(X+4,Y+4)-(315-X,187-X
),PSET,B
156Ø NEXTX
157Ø HCOLOR6:HPRINT(12,9),"NUMBE
R OF ROUNDS?"
1575 HCOLOR1Ø,Ø
158Ø JØ=JOYSTK(Ø):JØ=JØ*25
1585 IF JØ>999 THEN JØ=999
159Ø HLINE(15Ø,96)-(174,1Ø2),PRE
SET,BF
16ØØ HPRINT(18,12),JØ
16Ø5 IF BUTTON(Ø)=1 THEN NR=JØ:G
OTO162Ø
161Ø GOTO 158Ø
162Ø NR=NR+1
163Ø RETURN
2ØØØ 'title page routine
2Ø2Ø HCLSØ
2Ø3Ø FORX=1TO333:HSET(RND(319),R
ND(191),8):HSET(RND(319),RND(191
),14):HSET(RND(319),RND(191),4):
NEXTX
2Ø5Ø A$=T$(1)+T$(2)+T$(3)+T$(4)+
T$(5)
2Ø6Ø B$=T$(2)+T$(6)+T$(4)+T$(5)+
T$(7)+T$(8)
2Ø62 HCOLOR8:HLINE(Ø,Ø)-(319,191
),PSET,B
2Ø63 FORX=1 TO 12
2Ø65 C$="BM"+STR$(2Ø+X)+","+STR$
(78-X)+";"
2Ø66 IF X=4 THEN HCOLOR4:HLINE(2
,2)-(317,189),PSET,B
2Ø67 IF X=8 THEN HCOLOR14:HLINE(
4,4)-(315,187),PSET,B
2Ø68 IF X=11 THEN HCOLOR3:HLINE(
6,6)-(313,185),PSET,B
2Ø7Ø HDRAW"XC$;S16;XA$;XB$;"
2Ø75 C$="BM"+STR$(13Ø+X)+","+STR
$(164-X)+";"
2Ø8Ø HDRAW"XC$;S24;XT$(9);XT$(9)
;"
2Ø85 NEXTX
2Ø86 HCOLOR1Ø:HPRINT(15,22),"BY
MARK WEBB"
2Ø95 PALETTE1Ø,RND(16)+31:FORX=1
TO2Ø:NEXTX
2Ø96 IF BUTTON(Ø)=1 THEN2Ø99
2Ø97 IF INKEY$<>""THEN2Ø99
2Ø98 GOTO2Ø95
2Ø99 PALETTE1Ø,44
21ØØ RETURN
3ØØØ 'roll dice,show em div
3ØØ1 'and update graph.
3ØØ3 FORX=Ø TO 15:PALETTEX,P1(X)
:NEXTX
3ØØ5 HSCREEN2
3ØØ7 X=RND(-TIMER)
3Ø1Ø D(1)=RND(8):D(2)=RND(3):D(3
)=RND(5)
3Ø15 IF RND(5)=5 THEN IF D(2)=2
```




```
THEN D(2)=INT(3/RND(3))
3Ø2Ø D(3)=D(3)*5
3Ø25 HCOLOR2:FORX=Ø TO 2:HLINE(8
8+X*64,31)-(1Ø4+X*64,41),PSET,BF
:NEXTX
3Ø3Ø HCOLORØ:HPRINT(11,4),S$(D(1
)):HPRINT(19,4),E$(D(2)):HPRINT(
26,4),D(3)
3Ø4Ø IF D(2)=1 THEN SV(D(1))=SV(
D(1))+D(3)
3Ø5Ø IF SV(D(1))>=2ØØ THEN SV(D(
1))=2ØØ:GOSUB1ØØØ:GOSUB4ØØØ:GOTO
314Ø
3Ø6Ø IF D(2)=2 THEN SV(D(1))=SV(
D(1))-D(3)
3Ø7Ø IF SV(D(1))<=Ø THEN SV(D(1)
)=Ø:GOSUB1ØØØ:GOSUB45ØØ:GOTO314Ø
3Ø75 GOSUB1ØØØ
3Ø8Ø IF D(2)=3 THEN3Ø9Ø ELSE314Ø
3Ø9Ø IF SV(D(1))<1ØØ THEN 314Ø
31ØØ FORX=1 TO P
311Ø Y=S(X,D(1))/1ØØ*D(3)
312Ø M(X)=M(X)+Y
313Ø NEXTX
3135 FORX=1 TO 5:PLAY"T255L255O4
CDEFGABO5CEGB":NEXTX
314Ø RETURN
4ØØØ 'split routine
4Ø1Ø SV(D(1))=1ØØ
4Ø2Ø A$="*** "+SL$(D(1))+" HAS S
PLIT! ***"
4Ø3Ø X=INT((4Ø-LEN(A$))/2)
4Ø4Ø HCOLORD(1):HPRINT(X,7),A$
4Ø5Ø FORX=1 TO 1ØØ:PALETTED(1),R
ND(63):NEXTX
4Ø6Ø PALETTED(1),P1(D(1))
4Ø7Ø FORX=1 TO P:S(X,D(1))=S(X,D
(1))*2:NEXTX
4Ø8Ø GOSUB1ØØØ
4Ø9Ø HLINE(3Ø,55)-(279,64),PRESE
T,BF
41ØØ RETURN
45ØØ 'break routine
451Ø SV(D(1))=1ØØ
452Ø A$="### "+SL$(D(1))+" HAS B
USTED ###"
453Ø X=INT((4Ø-LEN(A$))/2)
```

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```
454Ø HCOLORD(1):HPRINT(X,7),A$
455Ø FORX=1 TO P:S(X,D(1))=Ø:NEX
TX
456Ø FORX=1 TO 1ØØØ:NEXTX
457Ø HLINE(3Ø,55)-(279,64),PRESE
T,BF
458Ø A$="ALL "+SL$(D(1))+" HAS B
EEN CONFISCATED"
459Ø X=INT((4Ø-LEN(A$))/2)
46ØØ HPRINT(X,7),A$
461Ø SOUND3Ø,2:GOSUB1ØØØ
462Ø FORX=24 TO 159
463Ø HLINE(X,55)-(X,64),PRESET:H
LINE(319-X,55)-(319-X,64),PRESET
464Ø NEXTX
465Ø RETURN
5ØØØ 'main startup section
5Ø1Ø 'game start gosubs
5Ø15 HSCREEN2
5Ø2Ø GOSUB2ØØØ
5Ø3Ø GOSUB75Ø:GOSUB5ØØ
5Ø4Ø GOSUB15ØØ
5Ø5Ø GOSUB7ØØØ
5Ø6Ø GOSUB12ØØ:GOSUB1ØØØ
5Ø7Ø GOSUB2ØØ
5Ø8Ø GOSUB25Ø
5Ø9Ø GOTO 3ØØ
51ØØ END
6ØØØ 'end routine
6Ø1Ø HSCREENØ
6Ø2Ø WIDTH32
6Ø3Ø RGB
6Ø4Ø CLSØ
6Ø5Ø FORX=1 TO 3Ø
6Ø6Ø PRINT@X,CHR$(128+RND(126));
6Ø61 PRINT@X+48Ø,CHR$(128+RND(12
6));
6Ø62 NEXTX
6Ø65 FORY=1 TO 14:PRINT@Y*32,CHR
$(128+RND(126));:PRINT@Y*32+31,C
HR$(128+RND(126));:NEXTY
6Ø7Ø POKE&HFFBC,45:POKE&HFFBD,Ø
6Ø8Ø PRINT@33," * * * * STOCKTIC
KER 88 * * *";
6Ø9Ø PRINT@1Ø6,"FINAL TOTALS";
6Ø92 PRINT@138,"==========="
61ØØ FORX=1 TO P
611Ø FORY=1 TO 8
612Ø M(X)=M(X)+SV(Y)*S(X,Y)/1ØØ
613Ø NEXTY,X
62ØØ FORX=1 TO P
621Ø PRINT@135+X*64,N$(X);
6215 PRINT@145+X*64,M(X);
622Ø NEXTX
623Ø PRINT@427,"GAME OVER";
624Ø POKE&HFFBC,5Ø:POKE&HFFBD,Ø
65ØØ I$=INKEY$:IFI$=""THEN65ØØ
651Ø GOTO 9999
7ØØØ 'name input routine
7Ø1Ø FORX=2ØØ TO 1Ø STEP-1Ø
7Ø2Ø SOUNDX,1
7Ø3Ø NEXTX
7Ø35 HCLS12
7Ø5Ø HCOLORØ:HLINE(Ø,1ØØ)-(319,1
Ø6),PSET
7Ø6Ø Y=8Ø
7Ø7Ø FORX=Ø TO 319
7Ø8Ø Z=RND(3)-2:Y=Y+Z
7Ø9Ø IF Y>98 THEN Y=98
71ØØ IF Y<5Ø THEN Y=5Ø
711Ø HSET(X,Y,Ø)
712Ø NEXTX
713Ø HPAINT(2,4Ø),11,Ø
714Ø HPAINT(Ø,191),13,Ø
716Ø HCOLOR14,Ø
717Ø HLINE(87,56)-(216,12Ø),PSET
,BF
7175 HCOLOR15
718Ø HLINE(91,6Ø)-(212,116),PSET
,BF
719Ø HCOLOR14
72ØØ HLINE(87,56)-(71,4Ø),PSET
721Ø HLINE-(2ØØ,4Ø),PSET:HLINE-(
216,56),PSET
722Ø HLINE(71,4Ø)-(71,1Ø4),PSET:
HLINE-(87,12Ø),PSET
723Ø HPAINT(73,1ØØ),8,14:HPAINT(
87,48),14,14
724Ø HLINE(112,12Ø)-(128,184),PS
ET,BF
725Ø HLINE(176,12Ø)-(192,184),PS
ET,BF
726Ø HLINE(176,184)-(16Ø,168),PS
ET
727Ø HLINE-(16Ø,12Ø),PSET
728Ø HLINE(112,184)-(96,168),PSE
T
729Ø HLINE-(96,12Ø),PSET
73ØØ HPAINT(1Ø4,16Ø),8,14
731Ø HPAINT(168,168),8,14
7315 HCOLOR8:HLINE(87,12Ø)-(216,
12Ø),PSET
7316 HLINE(87,56)-(216,56),PSET
732Ø HCOLORØ,Ø
733Ø HPRINT(12,8),"PLAYERS NAMES
?"
734Ø FORX =1 TO P
735Ø Y=Ø
736Ø HPRINT(12,9+X),"#"+RIGHT$(S
TR$(X),1)
737Ø I$=INKEY$:IFI$=""THEN737Ø
738Ø IFI$=CHR$(13) THEN743Ø
739Ø IF I$=CHR$(8) THEN HCOLOR15
:SOUND5Ø,1:HLINE(1Ø4,72+X*8)-(2Ø
Ø,8Ø+X*8),PSET,BF:N$(X)="":HCOLO
RØ:GOTO735Ø
74ØØ N$(X)=N$(X)+I$:IFLEN(N$(X))
=8 THEN743Ø
741Ø HPRINT(16+Y,9+X),I$:Y=Y+1
742Ø GOTO737Ø
743Ø NEXTX
744Ø RETURN
```

```
8ØØØ 'autobuy subroutine
8ØØ5 FL=Ø
8Ø1Ø FORX=1 TO 8
8Ø2Ø IF AB(U,X)=99 THEN FL=11:C=
Ø
8Ø3Ø NEXTX
8Ø4Ø IF FL<>11 THEN 8Ø9Ø
8Ø5Ø X=RND(8):C=C+1
8Ø55 IF C>=3Ø THEN 8Ø9Ø
8Ø56 IF AB(U,X)<>99 THEN8Ø5Ø
8Ø6Ø IF M(U)>=SV(X)*5 THEN S(U,X
)=S(U,X)+5ØØ:M(U)=M(U)-SV(X)*5
8Ø7Ø IF M(U)>=1ØØØ THEN8Ø5Ø
8Ø9Ø FL=Ø:RETURN
85ØØ 'autobuy on/off routine
851Ø JØ=JOYSTK(Ø):JØ=INT((JØ+1)/
8)
8515 IF JØ=Ø THEN JØ=1
852Ø Y=13
853Ø X=2+((U-1)*2Ø)
854Ø IF JØ>4 THEN X=X+4
855Ø IF JØ>4 THEN Y=Y+JØ-4 ELSE
Y=Y+JØ
856Ø LOCATEX,Y
857Ø ATTR6,Ø:PRINTS$(JØ);
858Ø FORZ=1 TO 222:NEXTZ
8585 LOCATEX,Y
859Ø ATTR2,Ø:PRINTS$(JØ);
86ØØ FORZ=1 TO 222:NEXTZ
861Ø IF BUTTON(Ø)=1 THEN IF AB(U
,JØ)=99 THEN AB(U,JØ)=Ø:GOTO863Ø
 ELSE AB(U,JØ)=99:GOTO863Ø
862Ø GOTO851Ø
863Ø PLAY"T255O3DDGGDDO1CCCO3DEF
D"
8632 FORZ=1 TO 8
8633 Y=13:X=2+((U-1)*2Ø)
8634 IF Z>4 THEN X=X+4
8635 IF Z>4 THEN Y=Y+Z-4 ELSE Y=
Y+Z
864Ø IF AB(U,Z)=99 THEN ATTR6,Ø:
LOCATEX,Y:PRINTS$(Z); ELSE ATTR2
,Ø:LOCATEX,Y:PRINTS$(Z);
8645 NEXTZ
865Ø RETURN
9999 HSCREENØ:WIDTH32:RGB:POKE&H
FFBC,45:POKE&HFFBD,Ø:POKE65496,Ø
:END
```

		1620	123
200	211	1840	123
330	118	2010	176
530	16	2180	5
760	47	2355	188
950	61	2620	166
1160	89	2840	12
1400	16	END	160

Listing 2: STOCKS2

```
1Ø CLSØ
2Ø CLEAR25ØØ
3Ø DIM BA$(14),G(6,4),G$(8),T(14
),L(6),L$(6),Z(6)
4Ø '
5Ø '***STOCK TICKER*86**********
6Ø '***BY MARK WEBB ************
7Ø '***FOR COCO 1&2*************
8Ø '***REVISED AUG. 88**********
9Ø '***BOX 793 GOLD RIVER B.C.**
1ØØ '**CANADA***VOP 1GØ*********
11Ø '
12Ø POKE142,Ø
13Ø X=RND(-TIMER)
14Ø PL$(1)="V31O5T1ØØL1GABBGABBG
ABBGABBGABBGABBGABBGABBGABB"
15Ø PL$(2)="V31T64O1L4CCFFCCFFCC
FFCCFFBCCFFCCFFCCFFCCFFCCFFCCFFC
CFFCCFFCCFF"
16Ø PL$(3)="V31T32O4BAGFEDCO3BAG
FEDCO2BAGFEDCO1BAGFEDC"
17Ø PL$(4)="V31T32O2CDEFGABO3CDE
FGABO4CDEFGABO5CDEFGAB"
18Ø PL$(5)="V31L16T255O4CEGBDFAC
EGBDFACEGBDFACEGBDFA"
19Ø PL$(6)="V31T28O4L4V15CV13CV1
1CV9CV7CV5CV3CV1CV3CV5CV7CV9CV11
CV13CV15C"
2ØØ G$(1)=STRING$(31,249):G$(2)=
STRING$(31,246)
21Ø G$(3)=STRING$(32,143):G$(4)=
STRING$(31,143)
22Ø U=1:AD=Ø
23Ø FORX=1TO6:READ D1$:S$(X)=D1$
:NEXTX
24Ø DATA GOLD,SILVER,OIL,BONDS,I
NDUST,GRAIN
25Ø FORX=1TO6:L(X)=1ØØ:NEXTX
26Ø FORX=1TO4
27Ø FORX1=1TO32
28Ø READD1:G$(4+X)=G$(4+X)+CHR$(
D1)
29Ø NEXTX1,X
3ØØ DATA 128,128,167,175,175,175
,175,17Ø,128,128,128,128,128,167
,175,175,175,175,17Ø,128,128,128
,128,128,167,175,175,175,175,17Ø
,128,128
31Ø DATA 128,167,175,175,175,175
,175,17Ø,128,128,128,128,167,175
,175,175,175,175,17Ø,128,128,128
```

```
,128,167,175,175,175,175,175,17Ø
,128,128
32Ø DATA 128,143,143,143,143,143
,175,17Ø,128,128,128,128,143,143
,143,143,143,175,17Ø,128,128,128
,128,143,143,143,143,143,175,17Ø
,128,128
33Ø DATA 128,143,143,143,143,143
,174,128,128,128,128,128,143,143
,143,143,143,174,128,128,128,128
,128,143,143,143,143,143,174,128
,128,128
34Ø 'title page layout
35Ø CLS3
36Ø SOUNDRND(255),1
37Ø FORX=1TO14:PRINT@32*X,CHR$(2
49);:PRINT@32*X+31,CHR$(249);:NE
XTX
38Ø PRINT@Ø,STRING$(32,249);:PRI
NT@48Ø,STRING$(31,249);
39Ø POKE1Ø55,249
4ØØ POKE 1535,249
41Ø PRINT@7Ø,"***STOCK TICKER*86
**";
42Ø PRINT@138,"BY M.WEBB";
43Ø PRINT@297-32,"JAN/Ø6,1984";
44Ø PRINT@265-32," COPYRIGHT ";
45Ø PRINT@326,"COCO 1-2 VERSION"
;
46Ø PRINT@387,"UPDATED MARCH 86
& AUG 88";
47Ø IF INKEY$=""THEN47ØELSE48Ø
48Ø '# of players set up
49Ø CLS3:PLAY"V31"
5ØØ SOUNDRND(88),3
51Ø PRINT@7Ø,"HOW MANY PLAYERS(1
-4)";:INPUTP
52Ø IF P=4 THEN 56Ø
53Ø PRINT@162,"DO YOU WISH HAL T
O PLAY ALSO";
54Ø I$=INKEY$:IFI$="" THEN 54Ø
55Ø IF I$="Y" OR I$="N" THEN 56Ø
 ELSE54Ø
56Ø PRINT@162,STRING$(3Ø,175);
57Ø IF I$="N" THEN JJ=7Ø:HF=88
58Ø FORX=1TO5:SOUNDRND(255),1:NE
XTX
59Ø IFP>4 THEN 48Ø
6ØØ FORX=1TOP
61Ø PRINT@134+(X-1)*64,"PLAYER #
";X;"NAME";:INPUTN$(X)
62Ø NEXTX
63Ø IF P=4 THEN 65Ø
64Ø IF I$="Y" THEN P=P+1:N$(P)="
HAL"
65Ø FORX=1TOP:M(X)=1ØØØØ:NEXTX
66Ø PLAYPL$(5)
67Ø CLS7
68Ø FORX=5 TO 26
69Ø PRINT@32+X,CHR$(159);
7ØØ PRINT@448+X,CHR$(159);
71Ø NEXTX
72Ø FORX=3 TO 12
73Ø PRINT@32*X+3,CHR$(159);:PRIN
T@X*32+28,CHR$(159);
74Ø NEXTX
75Ø PRINT@1Ø3,"HOW MANY ROUNDS";
76Ø PRINT@199,"(2ØØ-4ØØ) IS AVG.
";
77Ø PRINT@3Ø1,"?   ";
78Ø R$="":R=Ø
79Ø I$=INKEY$:IFI$=""THEN79Ø
8ØØ IFI$=CHR$(8) THEN PRINT@3Ø2,
STRING$(4,143);:GOTO78Ø
81Ø IFI$=CHR$(13) THEN83Ø
82Ø R$=R$+I$:PRINT@3Ø2,R$;:GOTO7
9Ø
83Ø PRINT@395,"OK? (Y/N)";:SOUND
22,1
84Ø I$=INKEY$:IFI$=""THEN84Ø
85Ø IFI$<>"Y" THEN I$=CHR$(8):GO
TO8ØØ
86Ø R=VAL(R$):IFR<=Ø THEN 67Ø
87Ø PLAY PL$(6)
88Ø '
89Ø CLS
9ØØ TP$=STRING$(6,128)+"stock"+C
HR$(128)+"ticker"+STRING$(14,128
)
91Ø PRINT TP$
92Ø POKE1Ø43,56:POKE1Ø44,54
93Ø PRINT@33,N$(1);:PRINT@49,N$(
2);:PRINT@257,N$(3);:PRINT@273,N
$(4);
94Ø PRINT@39,"$";:PRINT@55,"$";:
PRINT@263,"$";:PRINT@279,"$";
95Ø IF M(1)<1 THEN M(1)=Ø
96Ø IF M(2)<1 THEN M(2)=Ø
97Ø IF M(3)<1 THEN M(3)=Ø
98Ø IF M(4)<1 THEN M(4)=Ø
99Ø FORX=1 TO P
1ØØØ M(X)=INT(1ØØ*M(X))/1ØØ
1Ø1Ø NEXTX
1Ø2Ø PRINT@4Ø,M(1);:PRINT@56,M(2
);:PRINT@264,M(3);:PRINT@28Ø,M(4
);
1Ø3Ø FORX=1TO6
1Ø4Ø PRINT@32*X+33,LEFT$(S$(X),2
);:PRINT@32*X+49,LEFT$(S$(X),2);
1Ø5Ø NEXTX
1Ø6Ø FORX=8TO13
1Ø7Ø PRINT@32*X+33,LEFT$(S$(X-7)
,2);:PRINT@32*X+49,LEFT$(S$(X-7)
,2);
1Ø8Ø NEXT X
1Ø9Ø FORX=32TO192STEP32
```

```
11ØØ PRINT@4+X+32,G(X/32,1);:PRI
NT@2Ø+X+32,G(X/32,2);:PRINT@228+
X+32,G(X/32,3);:PRINT@244+X+32,G
(X/32,4);
111Ø NEXT X
112Ø FORX=Ø TO 5
113Ø PRINT@48Ø+X*5,L(X+1);
114Ø NEXT X
115Ø 'draw a square beside playe
r
116Ø IFU=1THENPRINT@32,CHR$(159)
;
117Ø IFU=2THENPRINT@48,CHR$(159)
;
118Ø IFU=3THENPRINT@256,CHR$(159
);
119Ø IFU=4THENPRINT@272,CHR$(159
);
12ØØ 'main loop
121Ø BS$=INKEY$
122Ø IF BS$="Q" THEN FL=Ø
123Ø IF BS$="A" THEN FL=1
124Ø IF FL=1 THEN 135Ø
125Ø IF BS$="H" THEN GOTO264Ø
126Ø IF BS$="^" THEN U=U+1:IF U>
P THEN U=1
127Ø IFBS$="^"THEN 88Ø
128Ø IFBS$="B"THEN191Ø
129Ø IF JJ=7Ø THEN 131Ø
13ØØ IF U=P THEN IF BS$="C" THEN
 JJ=7Ø:GOTO286Ø
131Ø IFBS$="S"THEN191Ø
132Ø IFBS$=CHR$(32)THEN135Ø
133Ø BS$=""
134Ø GOTO121Ø
135Ø 'dice roll and adjustments
136Ø IF HF=88 THEN 138Ø
137Ø IF RND(3)=2 THEN IF U=P THE
N GOSUB279Ø
138Ø RC=RC+1:IFRC>=R THEN 24ØØ
139Ø U=U+1:IF U>P THEN U=1
14ØØ 'roll three dice
141Ø PLAYPL$(2)
142Ø D(1)=RND(6):D(2)=RND(3):D(3
)=RND(3)
143Ø IF D(2)=2 THEN IF RND(1Ø)>7
 THEN D(2)=RND(2)*2+-1
144Ø IFD(3)=1THEN D(3)=5
145Ø IFD(3)=2THEN D(3)=1Ø
146Ø IFD(3)=3THEN D(3)=2Ø
147Ø 'ADJUST UP & DOWN
148Ø GOSUB162Ø
149Ø IF D(2)=1 THEN L(D(1))=L(D(
1))+D(3):PLAYPL$(4)
15ØØ IF L(D(1))>=2ØØ THEN GOSUB1
73Ø
151Ø IF D(2)=2 THEN L(D(1))=L(D(
1))-D(3):PLAYPL$(3)
152Ø IF L(D(1))<=Ø THEN GOSUB182
Ø
153Ø 'dividend routine
154Ø IF D(2)=3 THEN 155Ø ELSE 16
1Ø
155Ø IFL(D(1))<1ØØTHEN FORX=1TO5
ØØ:NEXTX:GOTO 161Ø
156Ø PLAY PL$(1)
157Ø FORX=1TOP
158Ø DV=G(D(1),X)/1ØØ*D(3)
159Ø M(X)=M(X)+DV
16ØØ NEXT X
161Ø GOTO 88Ø
162Ø CLSØ
163Ø PRINT@71,"# ROLLS LEFT "+ST
R$(R-RC);
164Ø PRINT@16Ø,G$(5);:PRINT@192,
G$(6);
165Ø PRINT@224,G$(7);:PRINT@256,
G$(7);
166Ø PRINT@288,G$(8);
167Ø PRINT@257,LEFT$(S$(D(1)),5)
;
168Ø IF D(2)=1 THENPRINT@269,"UP
";
169Ø IF D(2)=2 THENPRINT@268,"DO
```


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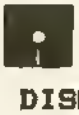
DS/DD DISKS  **$45/100 10/$4.95**

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```
WN";
17ØØ IF D(2)=3 THENPRINT@269,"DI
V";
171Ø PRINT@279,D(3);
172Ø RETURN
173Ø 'splitting routine
174Ø PRINT@396,"IT SPLIT!!";
175Ø FORX=1TO3:PLAYPL$(1):NEXTX
176Ø PRINT@396,"IT SPLIT!!";
177Ø L(D(1))=1ØØ
178Ø FORX=1TOP
179Ø G(D(1),X)=G(D(1),X)*2
18ØØ NEXTX
181Ø RETURN
182Ø 'breaking routine
183Ø L(D(1))=1ØØ
184Ø PRINT@396,"IT BROKE . . .";
185Ø PRINT@384+32,"IT FELL THROU
GH THE FLOOR EH!";
186Ø FOR X=1TOP
187Ø G(D(1),X)=Ø
188Ø NEXTX
189Ø FORX=1TO 8:SOUND122,1:SOUND
2Ø,1:NEXTX
19ØØ RETURN
191Ø 'buy & sell routine
192Ø 'display stocks first
193Ø SOUND2ØØ,1
194Ø CLSØ
195Ø PRINT@8,STRING$(17,236);:PR
INT@232,STRING$(17,227);
196Ø FORX=ØTO7:PRINT@X*32+7,CHR$
(229);:PRINT@X*32+25,CHR$(234);:
NEXTX
197Ø PRINT@266,CHR$(239);:PRINT@
277,CHR$(239);:PRINT@297,CHR$(22
7);:PRINT@298,CHR$(236);:PRINT@2
99,CHR$(227);:PRINT@3Ø8,CHR$(227
);:PRINT@3Ø9,CHR$(236);:PRINT@31
Ø,CHR$(227);
198Ø PRINT@32Ø,STRING$(32,239);
199Ø FOR X= 352TO448 STEP32:PRIN
T@X,G$(3);:NEXTX:PRINT@48Ø,G$(4)
;:POKE1535,143
2ØØØ PRINT@4Ø,"GOLD   IS AT";L(1
);
2Ø1Ø PRINT@72,"SILVER IS AT";L(2
);
2Ø2Ø PRINT@1Ø4,"OIL    IS AT";L(
3);
2Ø3Ø PRINT@136,"BONDS ARE AT";L(
4);
2Ø4Ø PRINT@168,"INDUST IS AT";L(
5);
2Ø5Ø PRINT@2ØØ,"GRAIN  IS AT";L(
6);
2Ø6Ø PRINT@3Ø1,LEFT$(N$(U),6);
2Ø7Ø PRINT@354,USING"$$##########
";M(U);
2Ø8Ø IFBS$="B"THENPRINT@333,"BUY
ING";
2Ø9Ø IFBS$="S"THENPRINT@333,"SEL
LING";
21ØØ PRINT@484,"PRESS *ENTER* TO
 RETURN";
211Ø PRINT@39Ø,"HOW MANY SHARES"
;:INPUTS:SOUNDRND(233),2
212Ø IFS=ØTHEN88Ø
213Ø IFS<5ØØ THEN 211Ø
214Ø PRINT@423,"OF WHICH STOCK "
;:INPUTU$:SOUND233,2
215Ø FORX=1TO6:IFLEFT$(U$,2)=LEF
T$(S$(X),2)THEN216ØELSE NEXTX:I$
="N":GOTO22ØØ
216Ø V=S/1ØØ*L(X)
217Ø PRINT@454,"VALUE IS";V;"OK(
Y/N)";:PLAY"T255O5CGDGECCGDGECC"
218Ø PRINT@485,"PRESS **Q** TO R
ETURN    ";
219Ø I$=INKEY$:IF I$=""THEN219Ø
22ØØ IF I$="N"  THEN PRINT@462,S
TRING$(8,143);:PRINT@4Ø5,STRING$
(8,143);:PRINT@438,STRING$(8,143
);:GOTO211Ø
221Ø IF I$="Q"THEN88Ø
222Ø IF BS$="B" THEN GOSUB225Ø:G
OTO 224Ø
223Ø IF BS$="S" THEN GOSUB234Ø
224Ø GOTO88Ø
225Ø 'value calculator to buy
226Ø IF V<=M(U) THEN 231Ø
227Ø PRINT@39Ø,"SORRY BUT YOU DO
NT    ";
228Ø PRINT@423,"HAVE ENOUGH MONE
Y     ";
229Ø PRINT@454,STRING$(21,143);
23ØØ SOUND3Ø,2Ø:RETURN
231Ø G(X,U)=G(X,U)+S
232Ø M(U)=M(U)-V
233Ø RETURN
234Ø 'value calculator to sell
235Ø IFG(X,U)>=S THEN236Ø ELSE P
RINT@39Ø,STRING$(24,143);:PRINT@
423,STRING$(24,143);:PRINT@454,S
TRING$(24,143);:PRINT@423,"NICE
TRY BUDDY";
2355 FORXW=1 TO 333:NEXTXW:GOTO8
8Ø
236Ø G(X,U)=G(X,U)-S
237Ø M(U)=M(U)+V
238Ø RETURN
239Ø 'end routine here eh
24ØØ CLS6:PRINT@167,"TIMES UP FO
LKS!!";
241Ø PRINT@227,"ALL STOCKS WILL
NOW BE SOLD!";
242Ø SOUND22Ø,2Ø
243Ø SOUND2ØØ,2Ø
244Ø SOUND22Ø,2Ø
245Ø SOUND2ØØ,2Ø
246Ø FORX=1TOP
247Ø FORY=1TO6
```

```
248Ø V=G(Y,X)/1ØØ*L(Y)
249Ø M(X)=M(X)+V
25ØØ NEXTY
251Ø NEXTX
252Ø FORX=1TO6:PLAYPL$(X):NEXTX
253Ø CLS8
254Ø FORX=3TO P*3 STEP 3
255Ø PRINT@X*32,N$(X/3);:PRINT@X
*32+7,USING"$$##########";M(X/3);
256Ø NEXTX
257Ø PN=1:HS=M(1)
258Ø FORX=2 TO P
259Ø IF M(X)>HS THEN HS=M(X):PN=
X
26ØØ NEXTX
261Ø FORX=1 TO 1333:NEXTX
262Ø PRINT@49Ø,N$(PN)+" WINS EH!
";
263Ø GOTO263Ø
264Ø 'help menu here
265Ø CLS
266Ø PRINT@1Ø,"STOCK TICKER";
267Ø PRINT@42,"------------";
268Ø PRINT@1Ø2,"H = HELP";
269Ø PRINT@134,"C = ORIGINAL BUY
 FOR HAL"
27ØØ PRINT@166,"A = AUTO ROLL";
271Ø PRINT@23Ø,"Q = QUIT AUTO RO
LL";
272Ø PRINT@262,"B = BUY STOCKS";
273Ø PRINT@198,"S = SELL STOCKS"
;
274Ø PRINT@483," PRESS ANY KEY T
O RETURN";
275Ø EXEC44539
276Ø GOTO 88Ø
278Ø 'hal routine
279Ø IF M(U)<1ØØØ THEN 2855
28ØØ CLSRND(8):PRINT@166,"I'M GO
NNA BUY";
281Ø Y=Ø
282Ø X=RND(6)
283Ø Y=Y+1:IFY=12 THEN2855
284Ø IF M(U)>=5ØØ/1ØØ*L(X) THEN
G(X,U)=G(X,U)+5ØØ:M(U)=M(U)-5ØØ/
1ØØ*L(X)
285Ø GOTO 282Ø
2855 RETURN
286Ø 'auto buy for hals
287Ø ' original buying
288Ø FOR X=1 TO 1Ø
289Ø RS=RND(6)
29ØØ G(RS,U)=G(RS,U)+1ØØØ
291Ø M(U)=M(U)-1ØØØ
292Ø NEXTX
293Ø U=1
294Ø GOTO 88Ø
```


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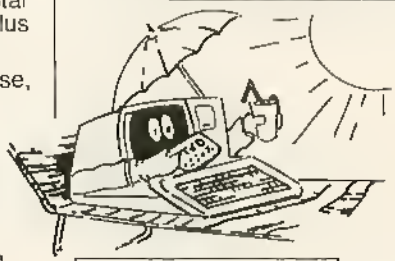

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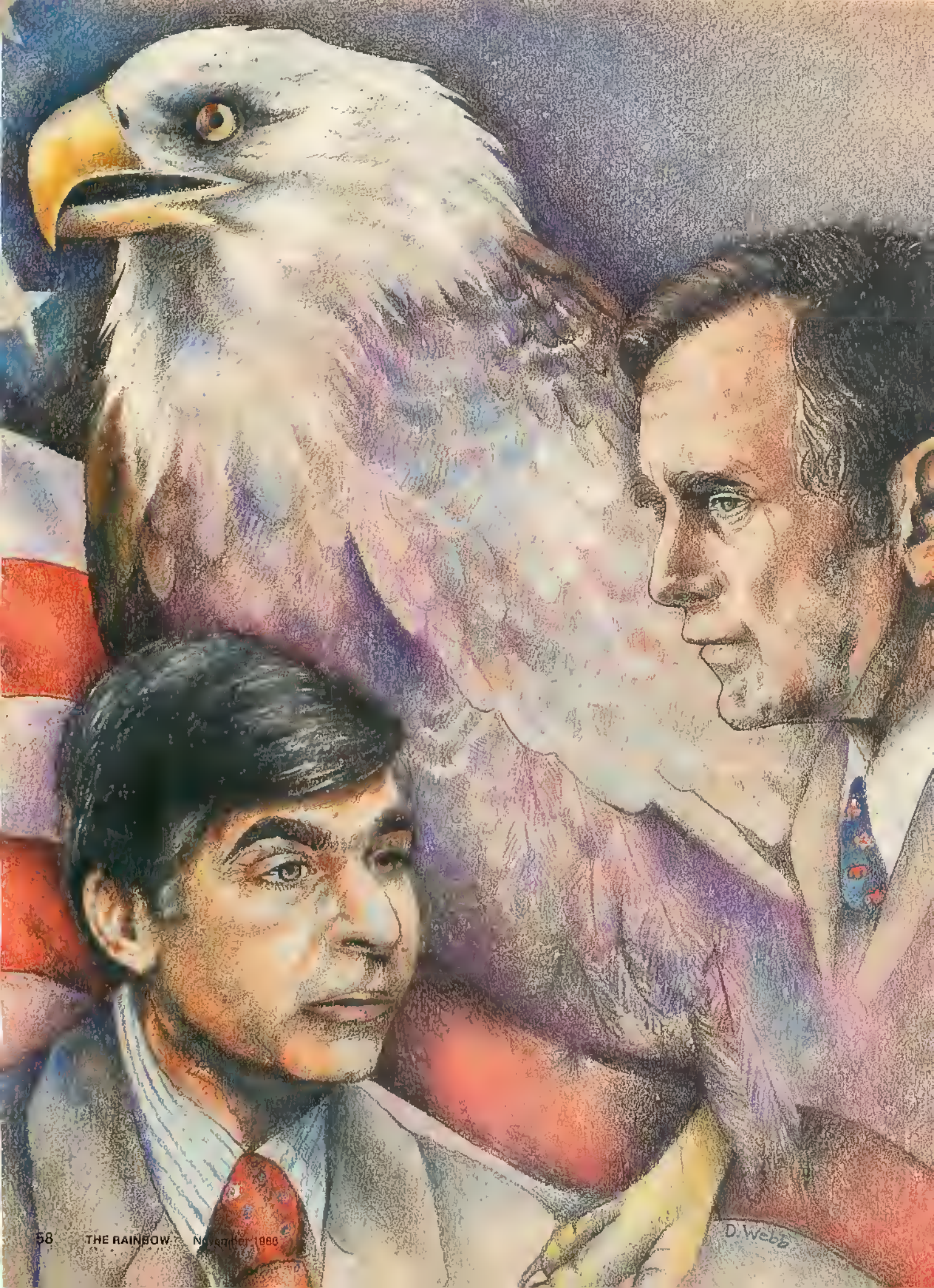
D. Webb

Use this program to keep track of election results and make your own predictions

Election '88

By Leonard Hyre

Tuesday, November 8, 1988 — Election Day — is here. After hearing presidential debates, reading the newspaper and listening to your heart, you made your decision. You voted for your favorite presidential candidate.

Now you wait. You made your choice, but did the rest of America agree with you? Most of us will sit through the evening, listening to the election results. Many will let their children stay up a little late because this night (like all election nights) is an important part of our country's heritage. We may tell our children about the voting process, or we may explain our presidential choice.

Election night is both solemn and exciting, but it is also a waiting game. We watch or listen as the results are posted. We listen as the newspeople make predictions or try, once again, to explain the electoral college. We wait. Many of you would like to *do* something on election night, and your children may have difficulty following the television-posted results. But what can you do?

THE RAINBOW is proud to present Leonard Hyre's *Election '88*. This program lets you plot the progress of the election results *as they come in*. You don't have to wait for your favorite newscasters to give the results, explain their significance and make their predictions. With this program, you can enter the information, see the results and make your own predictions.

The presidential election is a vital part of our political system. Whether or not our candidate wins, we know that our votes count in the decision-making process. THE RAINBOW and Leonard Hyre are happy to give you and your family a program that will make this election's coverage a little more fun and interesting. Enjoy election night, and enjoy *Election '88*!

Soon we will elect a man to lead our nation for the next four years — the president of the United States. Like most Americans, my political sense is heightened during the time preceding our presidential election. I am, as we all are, involved in an important decision.

In July, I presented *Convention* as an aid in understanding and enjoying each party's nomination process. *Election '88* is a companion to the previous program. *Election '88* will help you and your family enjoy and understand the election process by letting you tabulate election results, review election history and predict the election's outcome.

> ***"Gather the family around on or before Election Eve and let them guess which candidate will carry each state."***

Let's begin with a brief explanation of our electoral system. Our president and vice president are not elected by popular vote. Instead, they are elected by electoral vote. When we vote for a president, we are actually voting for a particular party's right to send its *electors* to the electoral college. Each state and the District of Columbia sends as many electors as it has senators and representatives. There are 538 electoral votes available. To win the presidency or the vice presidency, a candidate needs at least 270 votes. If neither candidate receives enough electoral votes, the Senate and the House of Representatives will elect the president.

Leonard Hyre is the author of Federal Hill Software's Handicapper *series and a number of articles for RAINBOW. He also published several articles in RAINBOW's sister publication, PCM, and is the author of* Sanyopoly, *a new Sanyo game from Michigan Software.*

Election '88's main objective is to keep track of the electoral votes as election-day results become available. Entering the votes by state is the first option on the program menu. If you choose to enter state votes, Option 1, you are asked for the two-letter postal abbreviation of the appropriate state. The program then presents that state's number of electoral votes. The program then asks you to identify who has received the electoral votes by pressing the initial letter of the following choices: Democrat, Republican or Undecided. After you have entered this information, the program will ask you for the next state. When you have entered all current information, type XX to exit Option 1. Your responses are then added to previous information and the results are tabulated.

Option 2 presents an onscreen current status report, which shows the total votes accrued by both parties and indicates how each state has voted. Option 3 gives you the same information on a one-page printout. These options will help you keep track of the electoral votes and predict the outcome of the election — just like the pros.

Option 4 adds a touch of magic to the program. A map of the United States is created. As you identify the winning party in each state, the state is painted the appropriate color. Use this option to illustrate the evening's progress, or use the map to reinforce your children's (or your) knowledge of United States geography. There might even be a lesson or two about party distribution or a candidate's campaign practices in this map. You decide.

Option 5 is a History Submenu, which (as the heading suggests) sends the program to a submenu that presents four options:

1. Democratic Tickets (1920 —)
2. Republican Tickets (1920 —)
3. U.S. Presidents (1920 to 1984)
4. Electoral College Facts

Selecting any one of these options sends you (or your child) to an information screen, which elaborates on the chosen subject. (This way, we won't just tally the electoral votes, we'll know how they work.

Menu Option 6 allows the user to save the data entries in progress and load them again at a later time. This will be most useful when using the last menu option to play "Political Predictions." Political Predictions is an option that lets you make a game out of the selection process. For this, gather the family around on or before Election Eve and let them guess which candidate will carry each state. After the final tabulations are in, *Election '88* will determine just how well the predictions match those of the electorate at large.

Election '88's program structure is straightforward and simple. You should have little trouble following the program logic. The first few lines dimension the necessary data space and display the title screen. Next, program data is listed and read into memory. Be careful typing these data statements. They must be accurate. Next, the main menu information is listed. (See REM statements in the program.) The routines for each function follow. The routine that deals with state results (Option 1) provides the information needed for the other options.

For the map routine, I used DATA statements to provide the LINE statements with needed information. (This shortened the length of the code needed and the typing required to enter it.) After the program creates the map for the first time, it gets the entire U.S. map as a graphic array. Therefore, when the program recalls the map, it puts the map on screen and skips the data section of the program. This solves all the programming problems and presents the map almost instantly. Users do not have to wait for the DRAW statement to perform its laborious task each time the map is called.

Typing in and running *Election '88* should present no serious problems *if* you enter the correct data, including all commas. If you have any problems with the program, look at the appropriate DATA statements.

Enjoy *Election '88*. Let's hope "our" candidate wins!

(Questions or comments concerning this program may be directed to the author at P.O. Box 403, Cambridge MD 21613. Please include an SASE when requesting a reply.) □

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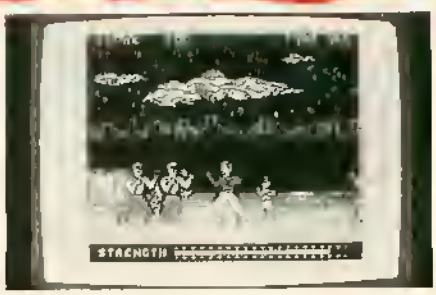
— 2/88 Rainbow review



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```
240 .....12  1330 .....163  2480 .....94
340 .....65  1422 .....6    2600 .....89
420 .....31  1600 .....0    2690 .....205
500 .....64  1770 .....165  2790 .....109
700 .....251 1910 .....132  2940 .....53
840 .....248 2050 .....86   4010 .....23
1020 .....4  2230 .....139  4504 .....7
1184 .....206 2340 .....190 END .....197
```

The listing: ELECTION

```
1Ø '**************************
2Ø '*      ELECTION 88         *
3Ø '*    (C) 7/88 L HYRE       *
4Ø '*     CAMBRIDGE  MD        *
5Ø '* ************************
6Ø '
1ØØ DIM M(6ØØ):REM MAP ARRAY
11Ø DIM LS$(51),S$(51),S(51),EV(
51),DP$(17),DV$(17),RP$(17),RV$(
17),OV(51),DW(51),SV(51),WN(17),
PP(51)
12Ø '
13Ø '***** TITLE SCREEN *****
14Ø '
15Ø CLS5:PRINT STRING$(64,175);
16Ø FOR X=2TO14 STEP 2:PRINT@X*3
2, STRING$(32,159);:NEXT
17Ø FOR X=17Ø TO 298 STEP 32:PRI
NT@X,STRING$(12," ");CHR$(128);:
NEXT:PRINT@182,CHR$(2Ø7);
18Ø PRINT@331,STRING$(12,128);
19Ø PRINT@2Ø3,"*ELECTION*";:PRIN
T@237,"* 88 *";:PRINT@268,"COVER
AGE";:PRINT@299,"BY RAINBOW";
2ØØ '
21Ø ' ***** PROGRAM DATA *****
22Ø '
23Ø DATA ALABAMA,AL,1,9,ALASKA,A
K,2,3,ARIZONA,AZ,3,7
24Ø DATA ARKANSAS,AR,4,6,CALIFOR
NIA,CA,5,47,COLORADO,CO,6,8,CONN
ECTICUT,CN,7,8
25Ø DATA DELAWARE,DE,8,3,DIST OF
 COLUMBIA,DC,9,3,FLORIDA,FL,1Ø,2
1,GEORGIA,GA,11,12
26Ø DATA HAWAII,HI,12,4,IDAHO,ID
,13,4,ILLINOIS,IL,14,24
27Ø DATA INDIANA,IN,15,12,IOWA,I
O,16,8,KANSAS,KS,17,7,KENTUCKY,K
Y,18,9,LOUISIANA,LA,19,1Ø
28Ø DATA MAINE,ME,2Ø,4,MARYLAND,
MD,21,1Ø,MASSACHUSETTS,MA,22,13,
MICHIGAN,MI,23,2Ø
29Ø DATA MINNESOTA,MN,24,1Ø,MISS
ISSIPPI,MS,25,7,MISSOURI,MO,26,1
1,MONTANA,MT,27,4
3ØØ DATA NEBRASKA,NE,28,5,NEVADA
,NV,29,4,NEW HAMPSHIRE,NH,3Ø,4,N
EW JERSEY,NJ,31,16
31Ø DATA NEW MEXICO,NM,32,5,NEW
YORK,NY,33,36,NORTH CAROLINA,NC,
34,13,NORTH DAKOTA, ND,35,3
32Ø DATA OHIO,OH,36,23,OKLAHOMA,
OK,37,8,OREGON,OR,38,7
33Ø DATA PENNSYLVANIA,PA,39,25,R
HODE ISLAND,RI,4Ø,4
34Ø DATA SOUTH CAROLINA,SC,41,8,
SOUTH DAKOTA,SD,42,3,TENNESSEE,T
N,43,11,TEXAS,TX,44,29
35Ø DATA UTAH,UT,45,5,VERMONT,VT
,46,3,VIRGINIA,VA,47,12
36Ø DATA WASHINGTON,WA,48,1Ø,WES
T VIRGINIA,WV,49,6,WISCONSIN,WI,
5Ø,11,WYOMING,WY,51,3
37Ø DATA JAMES M. COX,FRANKLIN D
. ROOSEVELT,JOHN W. DAVIS,CHARLE
S W. BRYAN,ALFRED E. SMITH,JOSEP
H T. ROBINSON,FRANKLIN D. ROOSEV
ELT,JOHN N. GARNER,FRANKLIN D. R
OOSEVELT, JOHN N. GARNER,FRANKLI
N D. ROOSEVELT, HENRY A. WALLACE
38Ø DATA FRANKLIN D. ROOSEVELT,
HARRY S. TRUMAN, HARRY S. TRUMAN
, ALBEN W. BARKLEY, ADLAI E. STE
VENSON, JOHN J. SPARKMAN, ADLAI
E. STEVENSON, ESTES KEFAUVER, JO
HN F. KENNEDY, LYNDON B. JOHNSON
, LYNDON B. JOHNSON, HUBERT H. H
UMPHREY
39Ø DATA HUBERT H. HUMPHREY, EDM
UND S. MUSKIE, GEORGE S. MCGOVER
N, R. SARGENT SHRIVER JR., JIMMY
 CARTER, WALTER F. MONDALE, JIMM
Y CARTER, WALTER F. MONDALE
4ØØ DATA WALTER F. MONDALE, GERA
LDINE FERRARO
41Ø DATA WARREN G. HARDING, CALV
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ARLES D. DAWES, HERBERT HOOVER,
CHARLES CURTIS, HERBERT HOOVER,
CHARLES CURTIS, ALFRED M. LANDON
, FRANK KNOX
42Ø DATA WENDELL L.WILKIE,CHARLE
S MCNARY,THOMAS E.DEWEY,JOHN W.B
RICKER,THOMAS E.DEWEY,EARL WARRE
N,DWIGHT D.EISENHOWER,RICHARD M.
NIXON,DWIGHT D.EISENHOWER,RICHAR
D M.NIXON,RICHARD M.NIXON,HENRY
CABOT LODGE
43Ø DATA BARRY M.GOLDWATER,WILLI
AM E.MILLER,RICHARD M.NIXON,SPIR
O T.AGNEW,RICHARD M.NIXON,SPIRO
T.AGNEW,GERALD R.FORD,ROBERT J.D
OLE,RONALD REAGAN,GEORGE BUSH,RO
NALD REAGAN,GEORGE BUSH
44Ø DATA 152,1ØØ,212,78,76,92,13
2,88
45Ø DATA 44,8Ø,92,72,2ØØ,52,192,
7Ø
```

```
46Ø DATA 212,98,172,116,164,1ØØ,
212,88
47Ø DATA 64,44,144,6Ø,156,6Ø,128
,56
48Ø DATA 1Ø8,76,16Ø,76,136,1Ø8,2
12,32
49Ø DATA 184,7Ø,2Ø4,48,16Ø,48,12
8,36
5ØØ DATA 144,1ØØ,132,72,8Ø,32,1Ø
8,6Ø
51Ø DATA 6Ø,72,2Ø4,44,196,64,92,
92
52Ø DATA 188,48,176,84,1Ø8,28,16
4,6Ø
53Ø DATA 12Ø,88,48,44,184,64,2Ø9
,53
54Ø DATA 176,98,1Ø8,44,16Ø,84,11
6,1Ø8
55Ø DATA 76,72,2ØØ,4Ø,18Ø,76,48,
28
56Ø DATA 172,72,14Ø,4Ø,88,52
57Ø DATA 2,2,2,1,1,1,1,1,2,2,1,1
,2,2,1,2,2
58Ø '
59Ø '****** READ IN DATA ******
6ØØ '
61Ø FOR X=1 TO 51:READ LS$(X),S$
(X),S(X),EV(X):NEXT
62Ø FOR X=1TO17:READDP$(X),DV$(X
):NEXT:FOR X=1TO17:READRP$(X),RV
$(X):NEXT
63Ø FOR X=1 TO 51:READ OV(X):REA
D DW(X):NEXT X
64Ø FOR X=1 TO 17:READ WN(X):NEX
T X
65Ø '
66Ø '**EXIT TITLE AFTER READ**
67Ø '
68Ø PRINT@464,"<PRESS ANY KEY>";
69Ø AK$=INKEY$:IF AK$=""THEN 69Ø
7ØØ '
71Ø '***** MAIN MENU HERE *****
72Ø '
73Ø CLS:PRINT STRING$(32,175);:P
RINT@33,"ELECTION COVERAGE BY RA
INBOW";:PRINT@64, STRING$(32,159
);
74Ø PRINT:PRINT"        MENU SELE
CTIONS....":PRINT:PRINT"   1>ENT
ER VOTING RESULTS":PRINT"   2>VI
EW  CURRENT VOTE STATUS":PRINT"
  3>PRINT CURRENT VOTE STATUS"
75Ø PRINT"   4>U.S.MAP WITH VOTE
 STATUS":PRINT"   5>HISTORY SUBM
ENU"
755 PRINT"   6>SAVE OR LOAD DATA
 FILE":PRINT"   7>PLAY";CHR$(34)
;"POLITICAL PREDICTION";CHR$(34)
76Ø PRINT:PRINT"    PRESS # OF S
ELECTION---";
77Ø AK$=INKEY$:IF AK$=""THEN 77Ø
```


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See our full page ad (page 53) in the October issue of Rainbow for sample picture and font printouts, or send for our free complete brochure.

Requirements: a Coco I, II or III with at least 32K, one disk drive, BASIC 1.0/1.1,ADOS 1.0/1.1 or JDOS. Printers supported include: Epson RX/FX, Gemini 10X, SG10, NX10, DMP 100/105/110/130/430 CGP220, many Okidata (check with Zebra), Seikosha GP100/250, Gorilla Banana, Legend 808. Ordering Instructions: All orders add $3.00 Shipping & Handling. UPS COD add $3.00. VISA/MC Accepted. NY residents add sales tax.

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```
78Ø IF VAL(AK$)>7 THEN 77Ø
79Ø IF AK$="1" THEN GOSUB 88Ø
8ØØ IF AK$="2" THEN GOSUB 112Ø
81Ø IF AK$="3" THEN GOSUB 133Ø
82Ø IF AK$="4" THEN GOSUB 152Ø
83Ø IF AK$="5" THEN GOSUB 162Ø
832 IF AK$="6" THEN GOSUB 4ØØØ
834 IF AK$="7" THEN GOSUB 45ØØ
84Ø GOTO 73Ø
85Ø '
86Ø '**** STATE RESULTS ****
87Ø '
88Ø CLS:PRINT STRING$(32,159):PR
INT@35,"VOTING RESULT ENTRY SCRE
EN":PRINT STRING$(32,175);
89Ø PRINT@448,STRING$(32,128);:P
RINT@484,"<ENTER XX FOR MAIN MEN
U>";
9ØØ PRINT@128,"ENTER STATE ABBRE
VIATION";:INPUT ST$
91Ø IF ST$="XX"THEN RETURN
92Ø FOR TEST=1 TO 51:IF ST$=S$(T
EST) THEN 95Ø
93Ø NEXT TEST
94Ø PRINT@128,"NO SUCH ABBREVIAT
ION! TRY AGAIN!":SOUND 1,1:FOR X
=1 TO 8ØØ:NEXT:GOSUB 3Ø7Ø:GOTO 8
8Ø
95Ø PRINT:PRINT"THE STATE OF ";L
S$(TEST):PRINT"WITH (";EV(TEST);
") VOTES HAS VOTED:"
96Ø PRINT"<D>EMOCRAT   <R>EPUBLI
CAN"
97Ø PRINT"<U>NDECIDED":PRINT:PRI
NT"ENTER D, R, OR U "
98Ø AK$=INKEY$:IF AK$=""THEN 98Ø
99Ø SV(TEST)=Ø:IF AK$="U" THEN 1
Ø7Ø
1ØØØ IF AK$="D" THEN SV(TEST)=1
1Ø1Ø IF AK$="R" THEN SV(TEST)=2
1Ø2Ø DV=Ø:RV=Ø
1Ø3Ø FOR X=1 TO 51
1Ø4Ø IF SV(X)=1 THEN DV=DV+EV(X)
1Ø5Ø IF SV(X)=2 THEN RV=RV+EV(X)
1Ø6Ø NEXT X
1Ø7Ø GOSUB 3Ø7Ø:GOTO 88Ø
1Ø8Ø RETURN
1Ø9Ø '
11ØØ '** SCREEN STATUS REPORT **
111Ø '
112Ø CLS:PRINT"UPDATE OF CURRENT
 STATUS":PRINT STRING$(32,175);"
NEEDED TO WIN: 27Ø VOTES"
113Ø PRINT@96,"DEMOCRATIC CURREN
T TOTAL =";:PRINT USING"###";DVD
V
114Ø PRINT@128,"REPUBLICAN CURRE
NT TOTAL =";:PRINT USING"###";RV
115Ø PRINT STRING$(32,159);:PRIN
T"STATE/DC     VOTES   RESULTS"
116Ø ZZ=1:XC=Ø:XV=Ø
117Ø FOR X=224 TO 384 STEP 32:PR
INT@X,LS$(ZZ)
118Ø PRINT @X+16,;:PRINT USING"#
#";EV(ZZ)
1182 XT$=" "
1183 IF SV(ZZ)=1 AND PP(ZZ)=1 TH
EN XT$="*":XC=XC+1
1184 IF SV(ZZ)=2 AND PP(ZZ)=2 TH
EN XT$="*":XC=XC+1
119Ø IF SV(ZZ)=1 THEN PRINT@X+19
,"DEMOCRATIC";XT$:ELSE IF SV(ZZ)
=2 THEN PRINT@X+19,"REPUBLICAN";
XT$:ELSE PRINT@X+19,"----------
";XT$
1191 IF SV(ZZ)<>Ø THEN XV=XV+1
12ØØ ZZ=ZZ+1
121Ø IF ZZ/6=INT(ZZ/6) THEN 122Ø
 ELSE GOTO 125Ø
122Ø PRINT:PRINT"<PRESS ANY KEY>
"
123Ø AK$=INKEY$:IF AK$=""THEN 12
3Ø
124Ø FOR Y=224 TO 416 STEP 32:PR
INT@Y,STRING$(32," "):NEXT Y:GOT
O 117Ø
125Ø IF ZZ=51 THEN 1265
126Ø NEXT X
1265 IF XV>Ø THEN PRINT:PRINT"YO
UR PREDICTIONS:":PRINT"YOU HAVE
";XC;"OUT OF";XV;"CORRECT":PRINT
"FOR A";INT((XC/XV)*1ØØ);" % ACC
URACY RATE."
127Ø PRINT@448,STRING$(32,128);:
PRINT@488,"< PRESS ANY KEY >";
128Ø AK$=INKEY$:IF AK$=""THEN 12
8Ø
129Ø RETURN
13ØØ '
131Ø '** PRINTOUT STATUS **
132Ø '
133Ø CLS:PRINT STRING$(32,159):P
RINT@38,"PRINTOUT CURRENT STATUS
":PRINT STRING$(32,175);
134Ø PRINT:PRINT"MAKE SURE PRINT
ER IS READY!"
135Ø PRINT:PRINT"PRESS <P> TO PR
INT":PRINT
136Ø PRINT"ANY OTHER KEY TO RETU
RN TO MENU"
137Ø AK$=INKEY$:IF AK$=""THEN 13
7Ø
138Ø IF AK$="P"THEN 139Ø ELSE GO
SUB 3Ø7Ø:RETURN
139Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"ELECTION NIGHT 88 - COVE
RAGE BY RAINBOW          *=CORR
ECT PREDICTION"
14ØØ PRINT#-2,STRING$(8Ø,"-")
14Ø5 XC=Ø:XV=Ø
141Ø FOR X=1 TO 51:PRINT#-2,LS$(
X);:PRINT #-2,TAB(24);S$(X);:PRI
```

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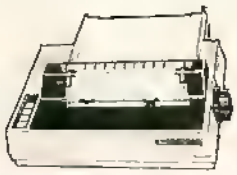

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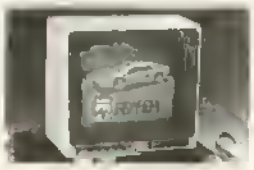
7622

8CM515



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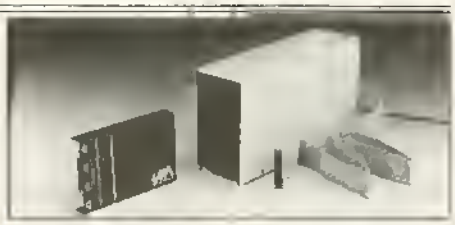

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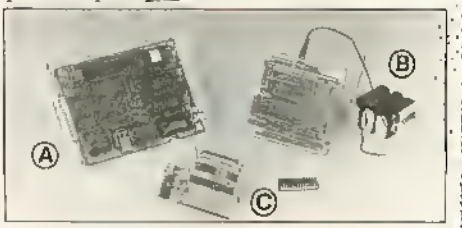

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```
NT#-2,TAB(4Ø);"Votes =";
1411 XT$=" "
142Ø PRINT #-2,USING "##";EV(X);
1421 IF SV(X)=1 AND PP(X)=1 THEN
 XT$="*":XC=XC+1
1422 IF SV(X)=2 AND PP(X)=2 THEN
 XT$="*":XC=XC+1
1423 IF SV(X)<>Ø THEN XV=XV+1
143Ø IF SV(X)=1 THEN PRINT#-2,TA
B(58);"DEMOCRATIC";XT$
144Ø IF SV(X)=2 THEN PRINT#-2,TA
B(58);"REPUBLICAN";XT$
145Ø IF SV(X)=Ø THEN PRINT#-2,TA
B(58);"----------"
146Ø NEXT X
147Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"DEMOCRATS HAVE ";DV;" VO
TES.";:PRINT#-2,TAB(4Ø);"REPUBLI
CANS HAVE ";RV;" VOTES."
1475 IF XV>Ø THEN PRINT#-2,"YOUR
 PREDICTIONS:";XC;" OUT OF ";XV;
" FOR A ";INT((XC/XV)*1ØØ);"% CO
RRECT SELECTON RATE"
148Ø RETURN
149Ø '
15ØØ '**** MAP FUNCTIONS ****
151Ø '
152Ø GOSUB 233Ø
153Ø FOR X=1 TO 51
154Ø IF SV(X)=1 THEN PAINT(OV(X)
,DW(X)),Ø,3
155Ø IF SV(X)=2 THEN PAINT(OV(X)
,DW(X)),2,3
156Ø NEXT X
157Ø AK$=INKEY$:IF AK$=""THEN 15
7Ø
158Ø RETURN
159Ø '
16ØØ '**** HISTORY SUBMENU ****
161Ø '
162Ø CLS:PRINT STRING$(32,159);"
* HISTORICAL INFORMATION  MENU *
";STRING$(32,2Ø7)
163Ø PRINT@129,"1> DEMOCRATIC TI
CKETS (192Ø-)"
164Ø PRINT@161,"2> REPUBLICAN TI
CKETS (192Ø-)"
165Ø PRINT@193,"3> U.S.PRESIDENT
S (192Ø-1984)":PRINT@225,"4> ELE
CTORAL COLLEGE FACTS"
166Ø PRINT@289,"ENTER 1,2,3 OR 4
 TO SELECT-"
167Ø PRINT@321,"ANY OTHER KEY FO
R MAIN MENU"
168Ø FY=192Ø
169Ø AK$=INKEY$:IF AK$=""THEN 16
9Ø
17ØØ IF VAL(AK$)>4 THEN SOUND 1,
```


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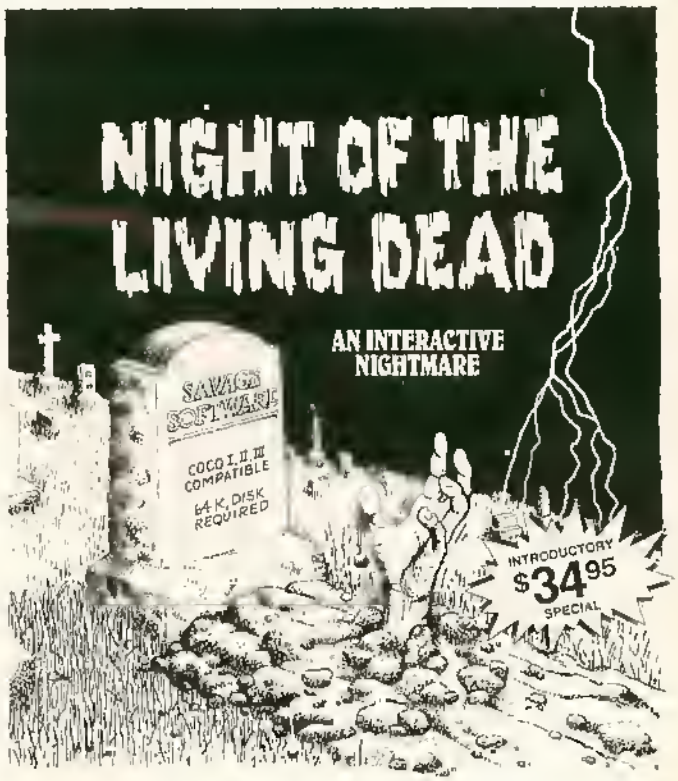

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```
1:GOTO 169Ø
171Ø IF AK$="1" THEN 179Ø
172Ø IF AK$="2" THEN 195Ø
173Ø IF AK$="3" THEN 211Ø
174Ø IF AK$="4" THEN 225Ø
175Ø RETURN
176Ø '
177Ø '** DEMOCRATIC NOMINEES **
178Ø '
179Ø CLS:PRINT STRING$(32,159);"
DEMOCRATIC PARTY NOMINEES-":PRIN
T STRING$(32,2Ø7):PRINT" YEAR...
.CANDIDATES":SS=16Ø
18ØØ FOR X=1 TO 17:PRINT@SS,FY;"
   ";DP$(X):PRINT@SS+41,DV$(X)
181Ø SS=SS+96:FY=FY+4
182Ø IF X/3<>INT(X/3) THEN 184Ø
ELSE PRINT@48Ø,"<PRESS ANY KEY>"
;:AK$=INKEY$:IF AK$=""THEN 182Ø
183Ø FOR WP=16Ø TO 384 STEP 32:P
RINT@WP,STRING$(32," "):NEXT WP:
SS=16Ø
184Ø NEXT X
185Ø PRINT@48Ø,"<P=PRINT-ANY OTH
ER=MAIN MENU>";
186Ø AK$=INKEY$:IF AK$=""THEN 18
6Ø ELSE IF AK$="P"THEN 187Ø ELSE
 RETURN
187Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"DEMOCRATIC CANDIDATES FO
R PRESIDENT/VICE PRESIDENT (192Ø
-1984)":PRINT#-2,STRING$(8Ø,"-")
188Ø FY=192Ø:FORX=1TO17
189Ø IF WN(X)=1 THEN WN$="*" ELS
E WN$=""
19ØØ PRINT#-2,FY;TAB(1Ø);"PRESID
ENT:";DP$(X);WN$;TAB(5Ø);"VP:";D
V$(X):PRINT#-2,"":FY=FY+4:NEXT X
191Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"* = Winner In Election":
RETURN
192Ø '
193Ø '** REPUBLICAN NOMINEES **
194Ø '
195Ø CLS:PRINT STRING$(32,159);"
REPUBLICAN PARTY NOMINEES-":PRIN
T STRING$(32,2Ø7):PRINT" YEAR...
.CANDIDATES":SS=16Ø
196Ø FOR X=1 TO 17:PRINT@SS,FY;"
   ";RP$(X):PRINT@SS+41,RV$(X)
197Ø SS=SS+96:FY=FY+4
198Ø IF X/3<>INT(X/3) THEN 2ØØØ
ELSE PRINT@48Ø,"<PRESS ANY KEY>"
;:AK$=INKEY$:IF AK$=""THEN 198Ø
199Ø FOR WP=16Ø TO 384 STEP 32:P
RINT@WP,STRING$(32," "):NEXT WP:
SS=16Ø
2ØØØ NEXT X
2Ø1Ø PRINT@48Ø,"<P=PRINT-ANY OTH
ER=MAIN MENU>";
2Ø2Ø AK$=INKEY$:IF AK$=""THEN 2Ø
2Ø ELSE IF AK$="P"THEN 2Ø3Ø ELSE
 RETURN
2Ø3Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"REPUBLICAN CANDIDATES FO
R PRESIDENT/VICE PRESIDENT (192Ø
-1984)":PRINT#-2,STRING$(8Ø,"-")
2Ø4Ø FY=192Ø:FORX=1TO17
2Ø5Ø IF WN(X)=2 THEN WN$="*" ELS
E WN$=""
2Ø6Ø PRINT#-2,FY;TAB(1Ø);"PRESID
ENT:";RP$(X);WN$;TAB(5Ø);"VP:";R
V$(X):PRINT#-2,"":FY=FY+4:NEXT X
2Ø7Ø PRINT#-2,STRING$(8Ø,"-"):PR
INT#-2,"* = Winner In Election":
RETURN
2Ø8Ø '
2Ø9Ø '**** PRESIDENTS ****
21ØØ '
211Ø CLS:PRINT STRING$(32,2Ø7);"
PRESIDENTS OF THE UNITED STATES
";STRING$(32,159)
212Ø FOR X=1 TO 17
213Ø IF X=9 THEN 214Ø ELSE 216Ø
214Ø PRINT:PRINT"<PRESS ANY KEY>
"
215Ø AK$=INKEY$:IF AK$=""THEN 21
5Ø ELSE:FOR WP=128 TO 448 STEP 3
2:PRINT@WP,STRING$(32," ");:NEXT
 WP:PRINT@128,"";
216Ø IF WN(X)=1 THEN PRINT FY;"
  ";DP$(X)
217Ø IF WN(X)=2 THEN PRINT FY;"
  ";RP$(X)
218Ø FY=FY+4
219Ø NEXT X
22ØØ PRINT@448,"<PRESS ANY KEY>"
;
221Ø AK$=INKEY$:IF AK$=""THEN 22
1Ø ELSE RETURN
222Ø '
223Ø '** ELECTORAL COLLEGE **
224Ø '
225Ø CLS:PRINTSTRING$(32,159):PR
INT@38,"ELECTORAL COLLEGE":PRINT
STRING$(32,2Ø7);
226Ø PRINT"   THE PRESIDENT AND
VP ARE":PRINT"ELECTED  BY THE  E
LECTORAL":PRINT"COLLEGE. EACH ST
ATE AND DC HAVE AS MANY ELECTORS
 AS SENATORS":PRINT"AND REPRESEN
TATIVES.WE ACTUALLY":PRINT"VOTE
FOR ELECTORS."
227Ø PRINT"   THERE ARE 538 VOTE
S. TO WIN, A CANDIDATE NEEDS 27Ø
 VOTES. IF":PRINT"NO CANDIDATE G
ETS THE NEEDED":PRINT"MAJORITY,
THE HOUSE AND SENATE":PRINT"ELEC
T THE PRESIDENT."
228Ø PRINT@484,"<PRESS ANY KEY>"
;
229Ø AK$=INKEY$:IF AK$=""THEN 22
```

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The Best
The Indispensable

The RAINBOW
THE COLOR COMPUTER MONTHLY MAGAZINE

THE RAINBOW is the biggest, best, brightest and most comprehensive publication a happy CoCo ever had! **THE RAINBOW** features more programs, more information and more in-depth treatment of the Tandy Color Computer than any other source.

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Proven Technology

New CoCo 3 Utilities

Great for 512K Systems! From Color Venture and OWL-WARE

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A great print spooler which gives you 44K print buffer from a 128K CoCo and up to 438K (200 pages!) from a 512K CoCo. With this spooler you can run a program while you are printing a file. The spooler does not slow down the computer to any noticeable extent while you are running a second program and no lost characters arise. Baud rates selectable. ***Printer Lightning*** can reside in memory along with ***RAMDISK***!

RAMDISK

Using 512K CoCo 3 you have access to 2 additional disk drives in RAM. All disk commands are supported, and the data are Reset button protected. You can now have up to 5 disk drive capacities on line at once and can assign the ram disks to any drive number. By making the ramdisk Drive 0, all programs which require a lot of drive access will run much faster. You can have the ***RAMDISK*** in memory at the same time as the ***Printer Lightning***!

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This program is the fastest way to make backup copies of your files using a 512K CoCo. You can backup 35, 40, or 80 track disks single or double sided. Both RS and OS-9 disks may be backed up. The original disk is saved to memory and a copy can be made on an ***unformatted disk*** every 45 seconds! The lightning read, write, format, and verify routines that were developed make this program much quicker that RSDOS or OS-9 for backups. This will become one of your most used programs!

·NEW·NEW·

Only $19.95 each. 3 for $39.95.

SPECIAL With our 512K Upgrade (Next page) only $2. each or 3 for $5!

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Da Vinci 3

- 16 colors on screen at one time
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- Use composite or RGB monitor
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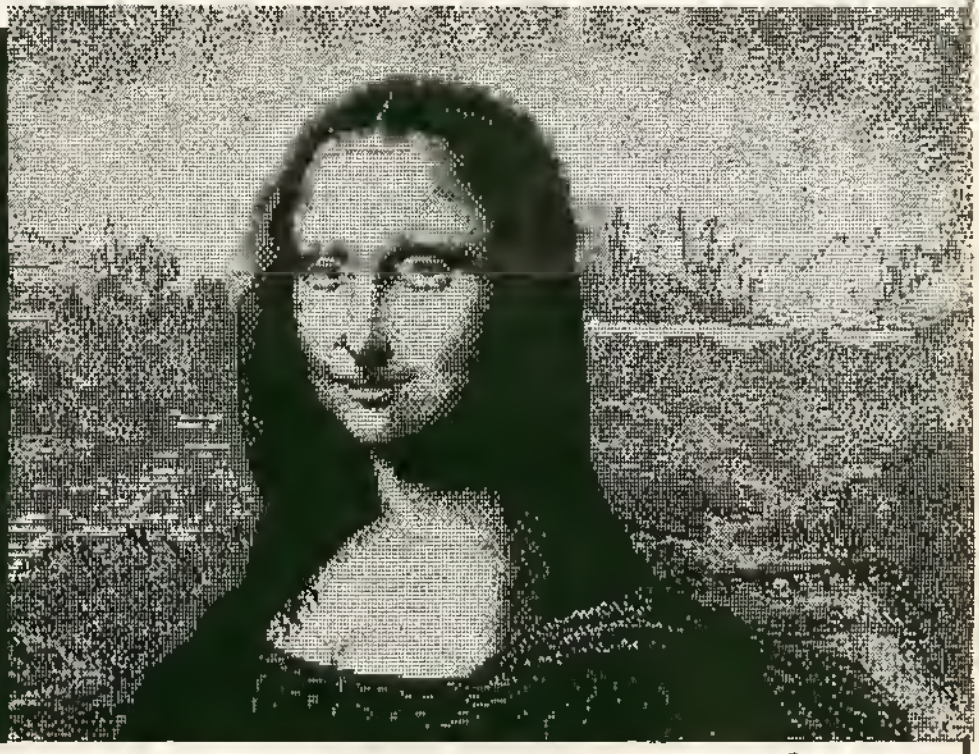
- Screen dump for Tandy mono and color ink-jet printers, (NX-10 and others pending)
- Sensible price
- No additional hardware required because of course/fine joystick movement modes
- Zoom mode for individual pixel editing
- Great on screen menu which is removable at the touch of a key to allow full screen edit

128K or 512K COCO 3 $37.95



Super I/O Board for OS-9

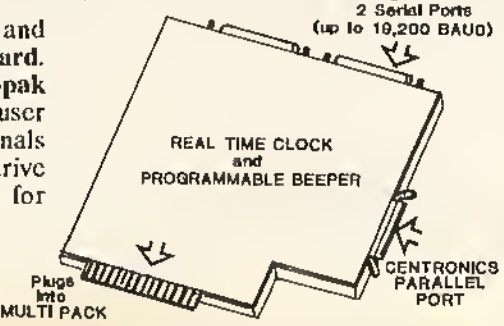
Each Board Provides 2 Serial Ports and Centronics Parallel Port

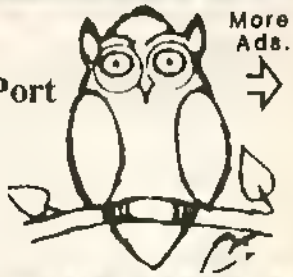
First Board has Real Time Clock and Beeper... With Second Board up to 5 Users

The serial ports are usable **up to 19,200 Baud**, and the parallel port is a **true Centronics standard.** Plug into your multi-pak. **On CoCo 3, multi-pak must be upgraded.** You will have a multi-user system with additional computers or terminals plugged into the serial ports. An OWL hard drive and 512K upgrade are strongly recommended for multi-user systems.

Intro Price... **$169.**

BOARD 2...$145.





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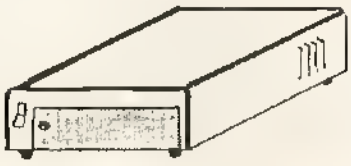
We have now been supplying CoCo hard drive systems and parts for more than 3 years. This is the longest history in the CoCo market of any system. Some other advertisers are stating that they have one of the most reliable systems for the CoCo *with all of 4 months history in the CoCo hard drive market*! We have reached our position in the hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

Because of many requests for a lower price system in kit form, we are now selling a kit of all parts at a significant discount compared to our regular prices. We recommend this kit (or any kits offered by any other supplier) only to those who have experience in electronic assembly and OS-9.

For OS-9 Levels 1 and 2



10 Meg.	20 Meg.	40 Meg.	80 Meg. (2 X 40 Meg.)
System Prices: (Includes Hard Drive, Controller, LR Tech Interface, Software. Fully assembled and tested.)			
$469.	$599.	$725.	$1,069.
Kit Prices: (LR Tech System as above but not assembled or tested.)			
$419.	$549.	$659.	$ 999.
Kit Prices: (As above but using Burke & Burke bus adapter)			
(na)	$489.	$609.	(lower prices)

30 Meg Kit: $539. (Lowest prices anywhere)

OWL Hard Drive BASIC 3

There have been several ads in this magazine about BASIC for Color Computer hard drive systems. These ads sometimes only tell a part of the story. Our BASIC system price includes **assembly**, **testing**, and **3-day burn-in** period. We do not require a Multi-pak to operate.

Our hard drive systems are fast, reliable, and reasonable in price. This has been proven by hundreds of users over the past 3 years. We do not have to turn off error checking for speed. We achieve high speed BASIC from a unique indexing method.

The table below will summarize some of the key points about our BASIC hard drive system and two other systems. We believe that we have the best BASIC interface for CoCo hard drives available.

BASIC Hard Drive Systems*

Feature	OWL	B&B	RGB
Drive Portion Available	Entire	Entire(?)	Entire
User Sets BASIC/OS-9 Partitions	YES	Yes	No
Add to Existing OS-9 Drive Without Reformat	YES	Yes(?)	No
Drives 0-3 Hard/Floppy	YES	No	Yes
Built in Park	YES	No	Yes
Speed*	FAST	Fast	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but all three systems are fast. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

Prices: With/Without Hard Drive

$35./$79.

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Why only double the capacity of your system when you can triple in the same case? Kit includes: double-sided to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Easy! Takes only 5 minutes!

Model $119. 500 **Model $129.** 501 or 502

All drives are new and fully assembled. We ship only FULLY TESTED and CERTIFIED at these low prices. We use Fuji, YE Data, and other fine brands. No drives are used or surplus unless otherwise stated to you when you order. We appear to be the one of the few advertisers in Rainbow who can truly make this claim. We have 5 years experience in the CoCo disk drive market! We are able to provide support when you have a problem.

Drives 1 Year Warranty

OWL Phones

Order Numbers (only)

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Technical Help

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OWL WARE Software Bundle

Disk Tutorial/Utilities/Games

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OWL DOS

An operating system that gives faster disk access and allows the use of double-sided drives. Corrects a floating point number error on early CoCo systems.

COPY-IT

Quickly copies selected programs between disks. A wild card option selects groups of programs to copy.

VERIFY

Verifies reading of each sector. Bad sectors are listed on the screen.

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We will select 2 games from our stock. These sold for more than $20 each.

If sold separately this is more than $125 worth of software!!

Do not mistake this software with cheap, non-professional "Public Domain" software which is being offered by others. All of this software is copyrighted and professional in quality. The tutor is unique with us and has helped thousands of new users learn their disk drive.

only $27.95
(or even better)
only $6.95 with
any Disk Drive Purchase!!

Our prices include a discount for cash but do not include shipping.

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```
9Ø ELSE RETURN
23ØØ '
231Ø '****** U.S.MAP ******
232Ø '
233Ø PMODE3,1:PCLS5:SCREEN1,1:CO
LOR3,1
234Ø LINE(Ø,Ø)-(255,191),PSET,B
235Ø LINE(1Ø,1Ø)-(245,181),PSET,
B
236Ø DRAW"BM11Ø,16Ø;D15F2R8E2U15
"
237Ø LINE(1Ø6,156)-(15Ø,179),PSE
T,B
238Ø DRAW"BM134,16Ø;BR1ØBD2H2L8G
2D4F2R8F2D4G2L8H2"
239Ø LINE(36,2Ø)-(36,22),PSET
24ØØ IF MP=2 THEN PUT(3Ø,2Ø)-(22
Ø,135),M:GOTO 289Ø
241Ø DATA6,34,22,36,34,36,41,33,
47,32,64,35,75
242Ø GOSUB 296Ø:DRAW"R2D2L2"
243Ø DATA7,41,89,45,9Ø,54,1Ø1,54
,1Ø3,64,1Ø3,77,1Ø7,87,1Ø7
244Ø GOSUB296Ø:DRAW"U1R5"
245Ø DATA42,97,112,97,115,1Ø3,11
7,1Ø4,115,1Ø9,116,116,125,124,12
8,124,122,126,118,129,122,13Ø,11
5,139,115,141,117,148,117
246Ø DATA 145,113,156,112,16Ø,11
4,163,112,167,118,167,121,171,12
7,171,129,173,131,178,129,178,12
1,177,116,172,1Ø7,175,1Ø2,178,1Ø
1,179,98,191,85,189,75,193,77,19
4,75,194,72,197,72,2ØØ,65,198,64
,199,61,197,59,2Ø7,56,212,53
247Ø GOSUB 296Ø:DRAW"U2R2D1":LIN
E-(215,51),PSET:DRAW"U2L2U1L2U6"
248Ø DATA12,22Ø,4Ø,221,35,218,34
,218,26,215,27,21Ø,25,2Ø7,35,2Ø4
,36,192,36,181,43,178,43,174,47
249Ø GOSUB 296Ø:DRAW"R2D2L2"
25ØØ DATA2,163,54,168,43,2,169,3
4,159,32,4,147,22,142,25,126,2Ø,
36,2Ø,36,34,39,35
251Ø GOSUB 296Ø:DRAW"U3R2D2R2U2"
:GOSUB296Ø:DRAW"U7L4U2":GOSUB296
Ø:GOSUB3Ø3Ø:DRAW"U2"
252Ø DATA2,48,36,57,36,57,2Ø,57,
44,3,55,46,58,47,58,53
253Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø
254Ø DATA2,32,54,75,54,49,54,49,
72,4,65,87,67,9Ø,64,93,64,1Ø3
255Ø GOSUB3ØØØ:GOSUB296Ø
256Ø DATA68,54,68,84,2,67,37,69,
44,6,75,42,97,42,76,6Ø,1Ø5,6Ø,84
,6Ø,84,1Ø7,68,81,127,81,1Ø5,6Ø,1
Ø5,81,1Ø2,81,1Ø2,1Ø4
257Ø GOSUB3Ø3Ø:DRAW"L3D3":DRAW"B
M62,2Ø;D8R2D8":GOSUB296Ø:DRAW"R7
U2D18R21U4Ø":GOSUB3ØØØ
258Ø DATA2,92,1Ø4,92,1Ø6,1Ø2,84,
112,84,4,112,93,119,96,131,96,13
3,115,119,2Ø,119,26
259Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø
26ØØ DRAW"BM127,81;D2R2D14":GOSU
B3Ø3Ø
261Ø DATA3,121,29,118,37,97,37,1
18,37,121,4Ø,5,121,54,118,53,117
,54,115,53,97,53,121,53,123,56,4
,122,62,125,66,127,69,127,81
262Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø:GOSUB3Ø3Ø:GOSUB296Ø
263Ø DATA2,1Ø5,66,125,66,143,25,
136,32,3,134,4Ø,137,51,148,51,2,
121,48,135,48,138,51,141,57,2,13
7,65,124,65,149,51,15Ø,53
264Ø GOSUB3ØØØ:DRAW"D2L2":GOSUB2
96Ø:DRAW"D1R2":GOSUB3ØØØ:GOSUB29
6Ø:GOSUB3Ø3Ø
265Ø DATA5,151,56,151,7Ø,149,73,
145,75,143,78,137,65,145,81,142,
84,137,97,137,97,139,1ØØ,4,138,1
Ø3,14Ø,1Ø8,144,1Ø8,145,113,2,139
,9Ø,168,9Ø,149,9Ø,148,112,158,9Ø
266Ø GOSUB296Ø:GOSUB3Ø3Ø:DRAW"D3
L3U2L14":GOSUB3Ø3Ø:DRAW"D1L6":GO
SUB3Ø3Ø:GOSUB296Ø:GOSUB3ØØØ:DRAW
"R4U4R8":GOSUB299Ø:DRAW"DM159,1Ø
9;R9U1R4"
267Ø PAINT(128,56),2,1
268Ø DATA173,1Ø4,168,93,169,89,1
8Ø,9Ø,183,93,158,9Ø,16Ø,87,2,163
,87,168,82,149,73,15Ø,74,4,153,7
2,154,72,16Ø,69,16Ø,54,16Ø,67,16
1,69,1Ø,162,68,165,7Ø,17Ø,78,173
,78,174,74,177,73,178,72,181,71,
187,72,189,77
269Ø GOSUB3Ø3Ø:DRAW"D1L2":GOSUB2
99Ø:DRAW"R5D1R6":GOSUB3Ø3Ø
27ØØ DRAW"BM144,83;R4U1R41"
271Ø GOSUB3Ø3Ø:GOSUB296Ø:GOSUB3Ø
3Ø
272Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø
273Ø DATA2,163,81,168,78,136,31,
14Ø,3Ø,6,144,34,146,34,148,4Ø,15
1,38,149,44,148,51,142,31,15Ø,27
,7,149,3Ø,152,31,156,29,159,33,1
55,34,15Ø,35,149,39,159,33,155,3
7,3,153,43,153,47,15Ø,53,157,35,
161,37
274Ø GOSUB3ØØØ:GOSUB296Ø:GOSUB3Ø
3Ø
275Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø:GOSUB3Ø3Ø
276Ø DRAW"D7R2U3"
```

```
277Ø DATA2,165,42,166,47,15Ø,54,
169,54,4,176,5Ø,176,47,183,44,18
4,42,172,52,172,68,3,191,68,194,
69,194,72,172,64,169,67,164,7Ø,1
93,58,192,58,191,63,2,193,64,191
,68,197,51,2Ø9,51,21Ø,54
278Ø GOSUB296Ø:GOSUB3Ø3Ø:GOSUB29
6Ø:GOSUB3Ø3Ø:GOSUB296Ø
279Ø DRAW"BM189,68;D3R6"
28ØØ GOSUB3Ø3Ø:GOSUB299Ø
281Ø DRAW"BM175,68;D4R5"
282Ø DRAW"BM175,51;D4R13"
283Ø GOSUB299Ø:DRAW"R4U9R2U12"
284Ø GOSUB3Ø3Ø:GOSUB296Ø:GOSUB3Ø
3Ø:GOSUB299Ø:GOSUB3ØØØ:GOSUB299Ø
285Ø DATA2,2Ø5,51,2Ø5,57,199,46,
2Ø7,47,21Ø,44,2Ø4,36,2Ø5,39,2,2Ø
3,43,2Ø3,47,2Ø9,32,2Ø8,35,2,2Ø9,
43,21Ø,43,2Ø2,6Ø,2Ø9,58,3,21Ø,6Ø
,2Ø6,61,2Ø2,6Ø
286Ø GOSUB 3Ø3Ø:GOSUB296Ø:GOSUB3
Ø3Ø:GOSUB296Ø
287Ø DRAW"BM189,69;C5D2R3":DRAW"
BM19Ø,69;C3D3R2"
288Ø IF MP<>2 THEN GET(3Ø,2Ø)-(2
2Ø,135),M:MP=2
289Ø DRAW"BM21Ø,8Ø;U6R6D6L6BR12U
6R4D6U3L4BR9BD3U6BR4G3F3"
29ØØ DRAW"BM21Ø,9Ø;U6R6D6L6BR12U
6D3R5U3D6BR6U6"
291Ø DRAW"BM21Ø,1ØØ;U6R6D6L6BR12
U6R3F1D4G1L3BR9U6R3F1BD4G1L3"
292Ø RETURN
293Ø '
294Ø '** READ MAP ONCE ONLY **
295Ø '
296Ø READA
297Ø FORX=1 TO A:READ B,C
298Ø LINE-(B,C),PSET:NEXTX:RETUR
N
299Ø READA,B:LINE-(A,B),PSET:RET
URN
3ØØØ READA
3Ø1Ø FOR X=1 TO A:READB,C,D,E
3Ø2Ø LINE(B,C)-(D,E),PSET:NEXTX:
RETURN
3Ø3Ø READA,B,C,D:LINE(A,B)-(C,D)
,PSET:RETURN
3Ø4Ø '
3Ø5Ø '** SCREEN CLEANUP **
3Ø6Ø '
3Ø7Ø FOR WIPE=128 TO 416 STEP 32
:PRINT@WIPE,STRING$(32," ");:NEX
T:RETURN
4ØØØ CLS:PRINT STRING$(32,175):P
RINT"LOAD OR SAVE DATA FILES..."
:PRINT STRING$(32,159)
4ØØ2 PRINT"CHOOSE 1>CASSETTE 2>D
ISK ":INPUT CD$
4ØØ4 PRINT"DATA FILES WILL INCLU
DE VOTES & PREDICTIONS."
4ØØ6 PRINT:PRINT"CHOOSE 1> SAVE
OR 2> LOAD":INPUT SL$
4ØØ8 IF SL$="1" THEN 4Ø12
4ØØ9 IF SL$="2" THEN 4Ø2Ø
4Ø1Ø SOUND 1,1:PRINT"CHOOSE 1 OR
 2!":FOR DL=1 TO 46Ø:NEXT:GOTO 4
ØØØ
4Ø12 IF CD$="2"THEN 4Ø16
4Ø13 OPEN "O",#-1,"ELECT.DAT"
4Ø14 FOR X=1 TO 51:WRITE #-1,SV(
X),PP(X):NEXT X:CLOSE #-1
4Ø15 RETURN
4Ø16 OPEN "O",1,"ELECT.DAT"
4Ø17 FOR X=1 TO 51:WRITE #1,SV(X
),PP(X):NEXT X:CLOSE 1
4Ø18 RETURN
4Ø2Ø IF CD$="2" THEN 4Ø26
4Ø21 OPEN "I",#-1,"ELECT.DAT"
4Ø22 FOR X=1 TO 51:INPUT #-1,SV(
X),PP(X):NEXT X:CLOSE #-1
4Ø23 RETURN
4Ø26 OPEN "I",1,"ELECT.DAT"
4Ø27 FOR X=1 TO 51:INPUT #1,SV(X
),PP(X):NEXT X:CLOSE 1
4Ø28 RETURN
45ØØ CLS:PRINT STRING$(32,175):P
RINT"POLITICAL PREDICTION.....":
PRINT STRING$(32,159);
45Ø2 PRINT"YOUR CHANCE TO OUT-EX
PERT THE   EXPERTS. ENTER YOUR P
REDICTION  AS TO HOW EACH STATE
WILL VOTE.";
45Ø4 PRINT" ELECTION 88 WILL COM
PARE YOUR   PREDICTIONS WITH THE
 ACTUAL VOTEAS IT IS ENTERED.":P
RINT
45Ø6 PRINT"<PRESS ANY KEY TO CON
TINUE>"
45Ø8 AK$=INKEY$:IF AK$=""THEN 45
Ø8 ELSE GOSUB 3Ø7Ø
45Ø9 FOR X=1 TO 51
451Ø PRINT@128,"ENTER YOUR PREDI
CTION FOR":PRINT "THE STATE OF "
;LS$(X):PRINT
4512 PRINT"<D>EMOCRAT OR <R>EPUB
LICAN"
4514 PRINT"<X> FOR MENU   ";:INP
UT CH$
4515 IF CH$="X"THEN 453Ø
4516 IF CH$="D" THEN PP(X)=1:GOT
O 452Ø
4517 IF CH$="R" THEN PP(X)=2:GOT
O 452Ø
4518 PP(X)=Ø
452Ø GOSUB 3Ø7Ø:NEXT X
453Ø RETURN
```

NOVICES NICHE

We're Looking for a Few Good Shorties

Help! The Niche needs more submissions! If you have written a good shortie, please send it in. We're looking for graphics, utilities, educational programs and games (especially games!). How short is a shortie? Well, if you printed out your listing in 32 columns, as we do, it should fit on one half of an 8½-by-11 inch page (be under 12 inches). (Entering `PRINT#-2,CHR$(27) CHR$(81)CHR$(32)` will allow most Epson-compatible printers to `LLIST` a program in 32 columns if you want to check this.)

Utilities

Free Zone

64K ECB

By Ric Pucella

Scroll Protect is a utility employing a machine language subroutine to protect an area of the screen from scrolling; the area can be affected only by the `PRINT @` command. *Scroll Protect* can be incorporated into another utility or a game, as long as the "parent" program works in the text screen.

When run, the program puts the CoCo in the 64K all-RAM mode (ROM instructions are copied into RAM, where they can be modified). It asks you for the top and bottom line of the "new" screen. These two values (from 0 to 15) will be the new borders of the screen, and anything above or below them lies in the protected zone, unaffected by the scroll. To restore the screen to its original size, press the reset button or run the program again.

The listing: `NOSCROLL`

```
1Ø '*** SCROLL PROTECT
2Ø '*** BY RIC PUCELLA
25 CLEAR &HFF,&H7FØØ
3Ø DATA 26,8Ø,142,128,Ø,166,132,
183,255,223,167,128,14Ø,224,Ø,39
,5,183,255,222,32,239,28,175,57
4Ø FOR A=3Ø72 TO 3Ø96:READB:POKE
A,B:NEXTA:EXEC3Ø72
5Ø FORX=&H7FØØ TO &H7F1D:READB$:
B=VAL("&H"+B$):POKE X,B:NEXTX
6Ø DATA BD,B3,E4,83,Ø1,FF,1Ø,22,
35,4Ø,C3,Ø5,FF,34,1Ø,9E,88,BF,7F
,FE,35,1Ø,DD,88,86,63,B7,7F,FD,3
9
7Ø FORX=&H7FAØ TO &H7FB8:READB$:
B=VAL("&H"+B$):POKE X,B:NEXTX
8Ø DATA B6,7F,FD,81,63,27,Ø5,86,
ØD,7E,B9,B1,BE,7F,FE,9F,88,7F,7F
,FD,86,ØD,7E,B9,B1
9Ø CLS:PRINT"LINES FROM Ø TO 15"
1ØØ PRINT@128,"TOP LINE:";:LINEI
NPUT TP$
11Ø TP=VAL(TP$)
12Ø IFTP<Ø OR TP>15 THEN 1ØØ
13Ø PRINT@128,"BOTTOM LINE:";:LI
NEINPUT BT$
14Ø BT=VAL(BT$)
15Ø IF BT<Ø OR BT>15 OR BT<=TP+1
 THEN 13Ø
16Ø TP=(TP*32+1Ø24)
17Ø T1=INT(TP/256):T2=TP-(T1*256
)
18Ø BT=(BT*32+1Ø24)
19Ø B1=INT(BT/256):B2=BT-(B1*256
)
2ØØ CLSØ
21Ø POKE &HA347,B1
22Ø POKE &HA348,B2+31
23Ø POKE &HA34C,T1
24Ø POKE &HA34D,T2
25Ø POKE &HA92B,T1
26Ø POKE &HA92C,T2
27Ø POKE &HA932,B1
28Ø POKE &HA933,B2+31
32Ø PR=BT-TP
34Ø PR=PR+TP
35Ø P1=INT(PR/256):P2=PR-(P1*256
)
36Ø POKE &HA354,P1
37Ø POKE &HA355,P2
42Ø POKE &HB9Ø3,&H7F
43Ø POKE &HB9Ø4,&HØØ
431 POKE &HB958,&H7E
432 POKE &HB959,&H7F
433 POKE &HB95A,&HAØ
44Ø CLS
```

I/O in the Fast Lane

64K DISK

By Joel Hegberg

Thumbing through the June '88 issue of RAINBOW, I came across Scott Honaker's article "Exercise Your Drives" (Page 110). It showed how to really speed up the CoCo's disk drives, but it didn't show how to use that speed for everyday operations. After a careful reading of the article, I loaded *EDTASM+*, started nosing my way through Disk BASIC and found the places that use the disk drives. I made a machine language program and, after days of trial and error, created *Fast Disk*.

The program first does a ROM-RAM conversion on the CoCo 1 and 2. Then it stores the ML program into memory and runs it. The program actually changes the drive step rate from a slow 30 milliseconds to a fast six milliseconds. It also reduces the wait period CoCo takes before reading the disk. Every time I use my CoCo 2, I run this program first.

I tested my efforts by timing how long it took to load *EDTASM+* before and after *Fast Disk*; it took 12 seconds before and only eight seconds after. *Fast Disk* also makes the drive quieter and stops the rattling that worries so many new users.

Just type in, save and run the program. *Fast Disk* requires no other programs to help it along, and it should be compatible with most of your BASIC programs. If you press the reset button, however, the system will revert to Disk BASIC. To prevent this, either make a reset patch or simply type `POKE 65503,0` at the OK prompt, to be back in *Fast Disk*.

The listing: FASTDISK

```
0 'FAST-DISK
1 '
2 'BY JOEL MATHEW HEGBERG
3 '936 NORTH TWELFTH STREET
4 'DE KALB, ILLINOIS  60115
5 '
6 CLEAR500:PCLEAR8:CLS:IFPEEK(3
3021)=50THEN7:ELSE10
7 GOSUB12
8 CLS:PRINT"FAST-DISK IS INSTALL
ED."
9 END
10 RESTORE:FORT=400TO422:READA
:POKET,A:NEXTT:EXEC400:GOTO7
11 DATA 26,80,16,142,128,0,127,2
55,222,166,164,127,255,223,167,1
60,16,140,255,0,37,240,57,-4
12 READA:IFA<>-4THEN12:ELSEP=573
44
13 READA:IFA=-1THEN14:ELSEPOKEP,
A:P=P+1:GOTO13
14 EXEC57344:RETURN
15 DATA 126,224,6,126,224,33,142
,224,3,166,128,183,215
16 DATA 101,236,132,253,215,102,
127,215,192,134,205,183
17 DATA 215,224,134,20,183,216,2
2,57,127,9,133,150,234
18 DATA 129,2,38,5,134,41,183,9,
134,126,215,104,0,-1
```

Graphics

Showing Off Random Graphics

CoCo 3

By Allen Goff

Loader and *Ellipse* are two complementary programs that let CoCo 3 users create a series of random graphics and store them for later recall. *Ellipse* allows the user some control over the final appearance of a graphic, and then saves that graphic (in binary format) to disk — it can save as many graphics as the disk will hold (about 20, as each "picture" takes up three granules of disk space).

When run, *Ellipse* prompts the user for the number of designs to save to disk and then calls on random horizontal and vertical values to draw a design of interlocking ellipses across and down the screen. Pressing the up arrow key begins the process anew, overlaying the first design with a different one. The pattern can become as complex as the user wishes. Pressing the right arrow key saves the graphic in its current stage of development. Pressing the space bar clears the screen. The program will continue generating ellipses until it has saved to disk the specified number of graphics.

When you have finished with graphics creation, load *Loader*, insert the "save" disk into the drive, and run. The program will ask you for the number of graphics to display and then proceed to display them in an automatic "slide-show." Although the pictures were drawn in PMODE 4, the program gives you the option of viewing them in PMODE 3.

Listing 1: LOADER

```
10 CLS
20 PRINT"     ********************
***     "
30 PRINT"     *  LOADER PROGRAM
  *     "
40 PRINT"     * PRESS 3 FOR MODE
3 *     "
50 PRINT"     * PRESS 4 FOR MODE
4 *     "
60 PRINT"     ********************
***
70 Z$=INKEY$:IF Z$=""THEN 70 ELS
E IF Z$="3" THEN P=3 ELSE IF Z$=
"4" THEN P=4 ELSE IF Z$<>"3" OR
Z$<>"4"THEN 70
80 INPUT"  ENTER NO.GRAPHICS TO
LOAD";N
90 IF N=0 THEN 80
100 FOR A=1 TO N
110 PMODE P,1:PCLS 1:SCREEN 1,1
120 LOADM(STR$(A))
130 FOR T=1 TO 1000:NEXT T
140 NEXT A
150 PCLS 1
160 RUN
170 END
180 GOTO 180
```

Listing 2: ELLIPSE

```
1Ø CLS
2Ø PRINT" ***********************
*******"
3Ø PRINT" *  ELIPSE TO SAVE GRAP
HICS  *"
4Ø PRINT" * PRESS ANY KEY TO CON
TINUE *"
5Ø PRINT" ***********************
*******"
6Ø INPUT"  ENTER NO.GRAPHICS TO
SAVE";N
7Ø IF N=Ø THEN 6Ø
8Ø FOR A=1 TO N
9Ø WIDTH 32:PALETTE CMP
1ØØ PMODE 4,1
11Ø PCLS 1
12Ø SCREEN 1,1
13Ø R=25
14Ø C=6
15Ø I=.25*RND(1Ø)
16Ø FOR Y=1 TO 191 STEP 27.142
17Ø FOR X=Ø TO 255 STEP 17.ØØ
18Ø CIRCLE(X,Y),R,C,I,Ø,.5
19Ø CIRCLE(X,Y),R,C,I,.5,Ø
2ØØ NEXT X,Y
21Ø R=R+1:IF R>5Ø THEN R=25
22Ø Z$=INKEY$:IF Z$=""THEN 22Ø E
LSE IF Z$="^"THEN 24Ø ELSE IF Z$
=CHR$(9)THEN 25Ø ELSE IF Z$<>" "
AND Z$<>"^"AND Z$<>CHR$(9)THEN 2
2Ø ELSE 23Ø
23Ø PCLS:GOTO 15Ø
24Ø PMODE 4,1:C=8:GOTO 15Ø
25Ø SAVEM(STR$(A)),3584,9727,358
4
26Ø NEXT A
27Ø GOTO 27Ø
28Ø END
```

Game

It's a Bug-Eat-Bug World

CoCo 3

By Stephen Elms

In *Centipede* you become a big insect with a voracious appetite for little insects. As the little mites pop up on the screen you use your arrow keys to race over and gulp them up. The only problem is that each bug you eat makes you grow (Mother Centipede always told you that eating your insects would make you grow big and strong). As your body grows longer and longer, it becomes more and more difficult to negotiate the little rectangle in life you've been allotted. Beware of running into your tail or bumping into a wall, for to do so is to court peril! Remember this one commandment and you will live to eat many bugs.

The listing: CENTPEDE

```
5 CLEAR
7 BUG$="S3;U3L2H2F2D3L2R2D3G2E2R
2U3R5L3D3F2H2U6E2"
3Ø HSCREEN 2
35 HCOLOR 1Ø
4Ø HPRINT(16,1Ø),"CENTIPEDE"
5Ø HPRINT(19,12),"BY"
6Ø HPRINT(14,14),"STEPHEN ELMS"
7Ø FOR X=1 TO 25ØØ:NEXT
8Ø DIM EL(8ØØ,1)
9Ø HSCREEN 2
1ØØ HCIRCLE(5,5),3,3
1Ø5 HPAINT(5,5),3,3
1Ø9 ON ERR GOTO 12Ø
11Ø HBUFF 1,1ØØ
115 HBUFF 2,1ØØ
12Ø HGET(Ø,Ø)-(1Ø,1Ø),1
125 HGET(1Ø,1Ø)-(2Ø,2Ø),2
13Ø HSCREEN 2
14Ø HCOLOR7:HLINE(1Ø,1Ø)-(31Ø,18
Ø),PSET,B:HPAINT(5,2),7,7
15Ø X=13Ø:Y=9Ø:L=1:N=1:C=1:MO=1
16Ø EL(N,Ø)=X:EL(N,1)=Y
17Ø N=N+1:IF N=8Ø1 THEN N=1
18Ø P=HPOINT(X,Y)
19Ø IF P<>Ø AND P<>1Ø THEN 49Ø
2ØØ IF P=1Ø THEN XC=1:LL=LL+5:C=
C+1Ø:SOUND45,1
21Ø GOSUB 38Ø
22Ø HPUT(X-5,Y-5)-(X+5,Y+5),1,PS
ET
23Ø IF C=Ø THEN HPUT (EL(L,Ø)-5,
EL(L,1)-5)-(EL(L,Ø)+5,EL(L,1)+5)
,2,PSET
24Ø IF C=Ø THEN L=L+1
25Ø IF L=8Ø1 THEN L=1
26Ø IF C>Ø THEN C=C-1
27Ø K$=INKEY$
28Ø IF K$="" THEN 33Ø
29Ø IF K$=CHR$(94) THEN MO=1
3ØØ IF K$=CHR$(9) THEN MO=2
31Ø IF K$=CHR$(1Ø) THEN MO=3
32Ø IF K$=CHR$(8) THEN MO=4
33Ø IF MO=1 THEN Y=Y-1Ø
34Ø IF MO=2 THEN X=X+1Ø
35Ø IF MO=3 THEN Y=Y+1Ø
36Ø IF MO=4 THEN X=X-1Ø
37Ø GOTO 16Ø
38Ø IF XC>1 THEN XC=XC-1:GOTO 48
Ø
39Ø IF XC=1 THEN HDRAW"BM"+X$+",
"+Y$+";C0;"+BUG$
```

```
4ØØ XC=Ø
41Ø RR=RND(1Ø)
42Ø IF RR<>6 THEN 48Ø
43Ø XX=(RND(25)*1Ø)+3Ø
44Ø YY=(RND(15)*1Ø)+2Ø
45Ø IF HPOINT(XX,YY)<>Ø THEN 43Ø
46Ø X$=STR$(XX):Y$=STR$(YY):HDRA
W"BM"+X$+","+Y$+";C1Ø;"+BUG$
47Ø XC=5Ø
48Ø RETURN
49Ø HCOLOR 1Ø
5ØØ HPRINT(16,1Ø),"SCORE "
5Ø5 HPRINT(17,12),LL
51Ø HPRINT(14,14),"PLAY AGAIN"
52Ø FOR DLAY=1 TO 2ØØØ:NEXT
53Ø K$=INKEY$:IF K$="" THEN 53Ø
54Ø IF K$="Y" THEN CLS:RUN
55Ø IF K$="N" THEN END ELSE 53Ø
```

Education

Odd One Out

16K ECB

By Ken Ostrer

If your children are unsure of, or just a little fuzzy on, which numbers are even and which are odd, *Even-Odd* may be of help. When you run the program, a small tutorial is presented, and then the student is drilled on the subject.

A line of numbers is displayed, and the student must press E or O depending on whether the number is even or odd. A bar at the bottom of the screen represents how much time is left for each set. If time runs out before the responses are complete, the drill will end. Speed and accuracy are of the utmost importance.

Six sets of numbers are presented per screen "page." To make things more interesting, the child must get at least 75 percent of the responses correct in order to advance to the next page. The child will probably get more out of this program if the parent and child solve the problems together.

The listing: EVENODD

```
1Ø CLEAR5ØØ:CLS:PRINT"EVEN ODD T
UTORIAL":PRINT:PRINT"NUMBERS THA
T END IN Ø, 2, 4, 6  OR 8 ARE ev
en NUMBERS."
2Ø PRINT:PRINT"NUMBERS THAT END
IN 1, 3, 5, 7  OR 9 ARE odd NUMB
ERS."
3Ø PRINT:PRINT"HERE ARE SOME EXA
MPLES OF EVEN  AND ODD NUMBERS:"
:PRINT"EVEN: 2, 4, 1Ø, 1Ø2, 2Ø6,
 3Ø4,  12ØØ, 5498, 12984, 5ØØØØ,
 183484"
4Ø PRINT"ODD: 1, 7, 19, 31, 99,
187, 3Ø3,1Ø97, 2555, 9999, 2Ø1Ø7
, 8Ø3345":FORX=1344TO15Ø3:IFPEEK
(X)>9ØTHENPOKEX,PEEK(X)-64ELSEPO
KEX,PEEK(X)-64
5Ø NEXT:PRINT"PRESS ANY KEY FOR
DRILL SECTION";:K$=INKEY$
6Ø IFINKEY$=""THEN6Ø
7Ø CLS:PRINT"EVEN ODD DRILLER":Z
=96:T=Ø:C=Ø:N=Ø:TT=Ø:X=RND(-TIME
R)
8Ø PRINT@449,"YOUR SCORE IS:"SC:
PRINT@481,"% RIGHT THIS PAGE:"Ø;
9Ø PRINT@19,"P:"PA+1:N=N+1:PRINT
@Z+1,CHR$(96+N);:FORX=1TORND(5)+
5:A$=A$+CHR$(RND(9)+48):NEXTX:PR
INT@Z-27,A$:PRINT@Z+5,STRING$(LE
N(A$),141);:PRINT@417,STRING$(3Ø
,128);
1ØØ K$=INKEY$:IFK$<>"O"ANDK$<>"E
"THENT=T+.1:PRINT@448-T," ";:IFP
EEK(1441)=96THENPLAY"T1Ø01FGGGGF
FEAGGGG":PRINT@32,"TIME'S UP!";:
FORM=ØTO75Ø:NEXTM:GOTO19ØELSE1ØØ
11Ø TT=TT+1:PRINT@Z+37+E,K$;
12Ø P=VAL(MID$(A$,E+1,1))
13Ø IFP/2=INT(P/2)THENIFK$="E"TH
ENSC=SC+P*1Ø:C=C+1:PLAY"T75O5AEE
EA":GOTO15Ø
14Ø IFP/2<>INT(P/2)THENIFK$="O"T
HENSC=SC+P*1Ø:C=C+1:PLAY"T75O5AE
EEA"
15Ø PRINT@448,STRING$(63,32);:PR
INT@449,"YOUR SCORE IS:"SC:PRINT
@481,"% RIGHT THIS PAGE:"C/TT*1Ø
Ø;
16Ø E=E+1:IFE<LEN(A$)THEN1ØØ
17Ø T=Ø:E=Ø:A$="":Z=Z+128:IFN=6T
HENIFC/TT>=.75THENPLAY"T5O5FBBCC
DCA":PRINT@32,"NEXT PAGE...";:FO
RM=ØTO15ØØ:NEXTM:PA=PA+1:GOTO7ØE
LSEPRINT@32,"SORRY, YOU DIDN'T G
ET 75% RIGHT.";:FORM=ØTO15ØØ:NEX
TM:GOTO19ØELSEIFN/3=INT(N/3)THEN
Z=112
18Ø GOTO9Ø
19Ø PRINT@32,"DO YOU WISH TO TRY
 AGAIN?       ";:K$=INKEY$
2ØØ K$=INKEY$:IFK$="Y"THENRUN7ØE
LSEIFK$<>"N"THEN2ØØELSECLS:END
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

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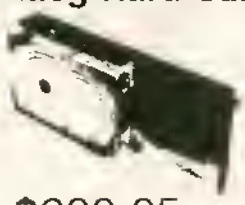

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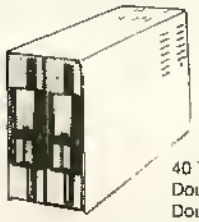

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The fifth in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC Part V: Get the Point

By William P. Nee

This *month's* programs change the color of various screen locations. Now, color information is stored in several locations in the Color Computer. Locations used in this article are as follows:

Location		Start-up
$B2	foreground color	(3)
$B3	background color	(0)
$B4	current color	(0)
$B5	$B4x(#$55)	(0)
$C2	PSET = 1; PRESET = 0	

As shown in Figure 1, colors depend on the PMODE and color set used.

The computer colors zero to three correspond to the BASIC colors one to four and five to eight. Three is the highest number used for color because 4x(#$55) would be greater than 255 and would not fit into Location $B5. With machine language, we can control and change the contents of the color locations throughout the program.

At start-up, the computer will store 0 in $B3 (for the background color) and 3 in $B2 (for the foreground color). *Using the PCLS* routine at $9542 will clear the screen to the background color. If you want a different background color, either load the desired color number into $B3 and JSR 9542, or load the desired color number into Register B and JSR $9536. (The latter will *not* change the background color in $B3.)

Location $C2 can be used as a toggle for PSET (if it is set to one) or to PRESET (if it is set to zero). However, the PSET routine we will use starts after the ROM routine has checked Location $C2, so we should use either the subroutine at $959A, which multiplies the color number by #$55 and stores this total at Location $B5, or PMODE 4/2/0, which will store a random 0 or −1 (RND(2)−2) in $B5 and then PSET or PRESET the point. (Remember, −1 is the same number as #$FF.) PMODE 3/1 will use a random (0 - 3)x(#$55) to PSET three colors or PRESET the background color.

Figure 1:

	Number	Set 0	Set 1	$B5
PMODE 3/1	0	green	buff	#$00
	1	yellow	cyan	#$55
	2	blue	magenta	#$AA
	3	red	orange	#$FF
PMODE 4/2/0	0	black	black	#$00
	3	green	buff	#$FF

You may also use the PPOINT routine at $933C to check the color of a bit at any horizontal location (by storing that bit in Location $BE) and any vertical location (by storing it in $C0). The result of the PPOINT routine is stored in FP1. JSR $B3ED will return the color number to Register B. In PMODE 3/1 the result will be colors one to four (if you are using color set to 0), or colors five to eight (if you are using color set to 1). In PMODE 4/2/0, the result will be zero or one with color set to 0, and zero or five with color set to 1. Your program may have different branches if Register B was equal/not equal to one of these colors. If a point has been PRESET, the PPOINT routine will make it the background color. (Note: You always lose registers A, B, and X, so be sure to save them first.)

The PSET routine is at Address $9374, and, as with most machine language programs, requires some additional set-up. The routine uses the following locations:

$B9	bytes per line
$BD/BE	horizontal coordinate — X1
$BF/C0	vertical coordinate — Y1

The coordinate locations are two bytes so that you could, for example, either STX $BD or STA $BE. X1 cannot be greater than 255; Y1 cannot be greater than 191; and neither can be less than zero.

A *scaling* routine at $931D is also required. Since we will pick up the PSET routine after ROM has scaled the coordinates, we must add this to our program prior to the PSET. Scaling adjusts X1 and Y1 to compensate for the different bytes per line (in $B9) assigned to the individual PMODES. Without this scaling routine, most graphic commands (PSET, LINE, CIRCLE, etc.) would be accurate only in PMODE 4. (The PPOINT routine we've already discussed includes the scaling subroutine.)

Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

Listing 1: POINTBAS

```
10 PMODE 4,1:PCLS:SCREEN 1,1
20 FOR N=0 TO 32
30 FOR NN=31 TO N STEP -1
40 B=RND(2)
50 FOR H=0 TO 192 STEP 64
60 FOR V=0 TO 128 STEP 64
70 ON B GOSUB 100,150
80 NEXT V,H,NN,N
90 GOTO 20
100 PSET(H+NN,V+NN-N):PSET(H+NN-
N,V+NN)
110 PSET(H+62-NN,V+NN-N):PSET(H+
62-NN+N,V+NN)
120 PSET(H+62-NN,V+62-NN+N):PSET
(H+62-NN+N,V+62-NN)
130 PSET(H+NN,V+62-NN+N):PSET(H+
NN-N,V+62-NN)
140 RETURN
150 PRESET(H+NN,V+NN-N):PRESET(H
+NN-N,V+NN)
160 PRESET(H+62-NN,V+NN-N):PRESE
T(H+62-NN+N,V+NN)
170 PRESET(H+62-NN,V+62-NN+N):PR
ESET(H+62-NN+N,V+62-NN)
180 PRESET(H+NN,V+62-NN+N):PRESE
T(H+NN-N,V+62-NN)
190 RETURN
```

The PSET routine in ROM uses registers A and B, so be sure to save any information in them first. Before running the program, set Location $FF/100 to #$2000. Since the program starts with PMODE, type "GPMODE" or "G3000" to execute it. Pressing any key will break the program, but you must hold the key down for several seconds because the program does a lot before getting to the *break* location. In the 'A' mode you can read the program and symbols from $2200 to $2B65.

Run the BASIC program first to get a feel for the design and program speed (or lack of it). Next, run the machine language program. (Note: The machine language program does *not* run on the CoCo 3.) If you run the machine language program from BASIC, clear enough memory with the command, CLEAR 200, &H3000-1. Even though the machine language program is eight times longer, it runs much more quickly.

(Questions or comments concerning this tutorial may be addressed to the author at Route 2, Box 216C, Mason, WI 54856-9302. Please enclose an SASE when requesting a reply.) □

Listing 2: POINTBIN

```
                    0005 *  $FF/100=#$2000
3000                0010        ORG     $3000
            9374    0011 PSET   EQU     $9374
            00BE    0012 X1     EQU     $BE
            00C0    0013 Y1     EQU     $C0
```


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Shell

OS9: rmode /w5 type=0
OS9: list /w5
OS9: rcb <<<>>>/w5 &
&D07

CLEAR

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OK
LOAD "DEMO"
OK
LIST
10 PMODE 4:SCREEN 1,1
20 X=RND(256)-1:Y=RND(192)-1
30 A=RND(256-X)-1:B=RND(192-Y)-1
40 LINE (X,Y)-(X+A,Y+B),PSET,BF

There is nothing wrong with your Color Computer. Do not attempt to adjust it.

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Please do not submit material *currently submitted* to another publication.

```
                BF1F    ØØ14Ø RND      EQU     $BF1F
3ØØØ C6         Ø4      ØØ15Ø PMODE    LDB     #4
3ØØ2 BD         9628    ØØ16Ø          JSR     $9628
3ØØ5 C6         Ø1      ØØ17Ø          LDB     #1      PAGE 1
3ØØ7 BD         9653    ØØ18Ø          JSR     $9653
3ØØA BD         9542    ØØ19Ø          JSR     $9542   PCLS
3ØØD C6         Ø1      ØØ2ØØ          LDB     #1      GRAPHICS SCREEN
3ØØF BD         95AA    ØØ21Ø          JSR     $95AA
3Ø12 C6         Ø1      ØØ22Ø          LDB     #1      COLOR SET 1
3Ø14 BD         9682    ØØ23Ø          JSR     $9682
3Ø17 4F                 ØØ24Ø START    CLRA
3Ø18 B7         3187    ØØ25Ø LOOP1    STA     N
3Ø1B C6         1F      ØØ26Ø          LDB     #31
3Ø1D F7         3188    ØØ27Ø LOOP2    STB     NN
3Ø2Ø C6         Ø2      ØØ28Ø RANDOM   LDB     #2
3Ø22 BD         BC7C    ØØ29Ø          JSR     $BC7C   REGISTER B TO FP1
3Ø25 BD         BF1F    ØØ3ØØ          JSR     RND     GET RANDOM(2)
3Ø28 BD         B3ED    ØØ31Ø          JSR     $B3ED   FP1 TO REGISTER D
3Ø2B 83         ØØØ2    ØØ32Ø          SUBD    #2      GET -1 OR Ø
3Ø2E D7         B5      ØØ33Ø          STB     $B5     -1=#$FF=PSET; Ø=PRESET
3Ø3Ø B6         3188    ØØ34Ø Q1       LDA     NN      POINT 1
3Ø33 B7         3189    ØØ35Ø          STA     XX
3Ø36 B6         3188    ØØ36Ø          LDA     NN
3Ø39 BØ         3187    ØØ37Ø          SUBA    N
3Ø3C B7         318A    ØØ38Ø          STA     YY
3Ø3F 17         ØØBØ    ØØ39Ø          LBSR    SHOW1
3Ø42 B6         3188    ØØ4ØØ QQ1      LDA     NN      POINT 2
3Ø45 BØ         3187    ØØ41Ø          SUBA    N
3Ø48 B7         3189    ØØ42Ø          STA     XX
3Ø4B F6         3188    ØØ43Ø          LDB     NN
3Ø4E F7         318A    ØØ44Ø          STB     YY
3Ø51 17         ØØ9E    ØØ45Ø          LBSR    SHOW1
3Ø54 86         3E      ØØ46Ø Q2       LDA     #62     POINT 3
3Ø56 BØ         3188    ØØ47Ø          SUBA    NN
3Ø59 87         3189    ØØ48Ø          STA     XX
3Ø5C 86         3188    ØØ49Ø          LDA     NN
3Ø5F 8Ø         3187    ØØ5ØØ          SUBA    N
3Ø62 87         318A    ØØ51Ø          STA     YY
3Ø65 17         ØØ8A    ØØ52Ø          LBSR    SHOW1
3Ø68 86         3E      ØØ53Ø QQ2      LDA     #62     POINT 4
3Ø6A BØ         3188    ØØ54Ø          SUBA    NN
3Ø6D B8         3187    ØØ55Ø          ADDA    N
3Ø7Ø 87         318B    ØØ56Ø          STA     XX
3Ø73 F6         3188    ØØ57Ø          LDB     NN
3Ø76 F7         318A    ØØ58Ø          STB     YY
3Ø79 17         ØØ76    ØØ59Ø          LBSR    SHOW1
3Ø7C 86         3E      ØØ6ØØ Q3       LDA     #62     POINT 5
3Ø7E BØ         3188    ØØ61Ø          SUBA    NN
3Ø81 87         3189    ØØ62Ø          STA     XX
3Ø84 86         3E      ØØ63Ø          LDA     #62
3Ø86 BØ         3188    ØØ64Ø          SUBA    NN
3Ø89 B8         3187    ØØ65Ø          ADDA    N
3Ø8C B7         318A    ØØ66Ø          STA     YY
3Ø8F 17         ØØ6Ø    ØØ67Ø          LBSR    SHOW1
3Ø92 86         3E      ØØ68Ø QQ3      LDA     #62     POINT 6
3Ø94 BØ         3188    ØØ69Ø          SUBA    NN
3Ø97 8B         3187    ØØ7ØØ          ADDA    N
3Ø9A B7         3189    ØØ71Ø          STA     XX
3Ø9D 86         3E      ØØ72Ø          LDA     #62
3Ø9F 8Ø         3188    ØØ73Ø          SUBA    NN
3ØA2 B7         318A    ØØ74Ø          STA     YY
3ØA5 17         ØØ4A    ØØ75Ø          LBSR    SHOW1
3ØA8 F6         3188    ØØ76Ø Q4       LDB     NN      POINT 7
3ØAB F7         3189    ØØ77Ø          STB     XX
3ØAE 86         3E      ØØ7BØ          LDA     #62
3ØBØ BØ         3188    ØØ79Ø          SUBA    NN
3ØB3 BB         3187    ØØ8ØØ          ADDA    N
3ØB6 87         318A    ØØ81Ø          STA     YY
3ØB9 17         ØØ36    ØØ82Ø          LBSR    SHOW1
3ØBC B6         3188    ØØ83Ø QQ4      LDA     NN      POINT 8
3ØBF BØ         3187    ØØ84Ø          SUBA    N
3ØC2 B7         3189    ØØ85Ø          STA     XX
3ØC5 86         3E      ØØ86Ø          LDA     #62
3ØC7 BØ         3188    ØØ87Ø          SUBA    NN
3ØCA B7         318A    ØØ88Ø          STA     YY
3ØCD 17         ØØ22    ØØ89Ø          LBSR    SHOW1
3ØDØ F6         3188    ØØ9ØØ FINISH   LDB     NN
```

```
3ØD3 5A           ØØ91Ø          DECB
3ØD4 F1   3187    ØØ92Ø          CMPB    N
3ØD7 1Ø2C FF42    ØØ93Ø          LBGE    LOOP2
3ØDB B6   3187    ØØ94Ø          LDA     N
3ØDE 4C           ØØ95Ø          INCA
3ØDF 81   2Ø      ØØ96Ø          CMPA    #32
3ØE1 1Ø25 FF33    ØØ97Ø          LBLO    LOOP1
3ØE5 AD   9F AØØØ ØØ98Ø          JSR     [$AØØØ] ANY INPUT?
3ØE9 1Ø27 FF2A    ØØ99Ø          LBEQ    START
3ØED 5F           Ø1ØØØ          CLRB            SET FOR TEXT SCREEN
3ØEE BD   95AA    Ø1Ø1Ø          JSR     $95AA
3ØF1 3F           Ø1Ø2Ø          SWI             RTS IF IN BASIC
3ØF2 FC   3189    Ø1Ø3Ø SHOW1    LDD     XX      SQUARE 1
3ØF5 97   BE      Ø1Ø4Ø          STA     X1
3ØF7 D7   CØ      Ø1Ø5Ø          STB     Y1
3ØF9 BD   9374    Ø1Ø6Ø          JSR     PSET
3ØFC FC   3189    Ø1Ø7Ø SHOW2    LDD     XX      SQUARE 2
3ØFF 8B   4Ø      Ø1Ø8Ø          ADDA    #$4Ø
31Ø1 97   BE      Ø1Ø9Ø          STA     X1
31Ø3 D7   CØ      Ø11ØØ          STB     Y1
31Ø5 BD   9374    Ø111Ø          JSR     PSET
31Ø8 FC   3189    Ø112Ø SHOW3    LDD     XX      SQUARE 3
31ØB 8B   8Ø      Ø113Ø          ADDA    #$8Ø
31ØD 97   BE      Ø114Ø          STA     X1
31ØF D7   CØ      Ø115Ø          STB     Y1
3111 BD   9374    Ø116Ø          JSR     PSET
3114 FC   3189    Ø117Ø SHOW4    LDD     XX      SQUARE 4
3117 8B   CØ      Ø118Ø          ADDA    #$CØ
3119 97   BE      Ø119Ø          STA     X1
311B D7   CØ      Ø12ØØ          STB     Y1
311D BD   9374    Ø121Ø          JSR     PSET
312Ø FC   3189    Ø122Ø SHOW5    LDD     XX      SQUARE 5
3123 CB   4Ø      Ø123Ø          ADDB    #$4Ø
3125 97   BE      Ø124Ø          STA     X1
3127 D7   CØ      Ø125Ø          STB     Y1
3129 BD   9374    Ø126Ø          JSR     PSET
312C FC   3189    Ø127Ø SHOW6    LDD     XX      SQUARE 6
312F C3   4Ø4Ø    Ø128Ø          ADDD    #$4Ø4Ø
3132 97   BE      Ø129Ø          STA     X1
3134 D7   CØ      Ø13ØØ          STB     Y1
3136 BD   9374    Ø131Ø          JSR     PSET
3139 FC   3189    Ø132Ø SHOW7    LDD     XX      SQUARE 7
313C C3   8Ø4Ø    Ø133Ø          ADDD    #$8Ø4Ø
313F 97   BE      Ø134Ø          STA     X1
3141 D7   CØ      Ø135Ø          STB     Y1
3143 BD   9374    Ø136Ø          JSR     PSET
3146 FC   3189    Ø137Ø SHOW8    LDD     XX      SQUARE 8
3149 C3   CØ4Ø    Ø138Ø          ADDD    #$CØ4Ø
314C 97   BE      Ø139Ø          STA     X1
314E D7   CØ      Ø14ØØ          STB     Y1
315Ø BD   9374    Ø141Ø          JSR     PSET
3153 FC   3189    Ø142Ø SHOW9    LDD     XX      SQUARE 9
3156 CB   8Ø      Ø143Ø          ADDB    #$8Ø
3158 97   BE      Ø144Ø          STA     X1
315A D7   CØ      Ø145Ø          STB     Y1
315C BD   9374    Ø146Ø          JSR     PSET
315F FC   3189    Ø147Ø SHOW1Ø   LDD     XX      SQUARE 1Ø
3162 C3   4Ø8Ø    Ø148Ø          ADDD    #$4Ø8Ø
3165 97   BE      Ø149Ø          STA     X1
3167 D7   CØ      Ø15ØØ          STB     Y1
3169 BD   9374    Ø151Ø          JSR     PSET
316C FC   3189    Ø152Ø SHOW11   LDD     XX      SQUARE 11
316F C3   8Ø8Ø    Ø153Ø          ADDD    #$8Ø8Ø
3172 97   BE      Ø154Ø          STA     X1
3174 D7   CØ      Ø155Ø          STB     Y1
3176 BD   9374    Ø156Ø          JSR     PSET
3179 FC   3189    Ø157Ø SHOW12   LDD     XX      SQUARE 12
317C C3   CØ8Ø    Ø158Ø          ADDD    #$CØ8Ø
317F 97   BE      Ø159Ø          STA     X1
3181 D7   CØ      Ø16ØØ          STB     Y1
3183 BD   9374    Ø161Ø          JSR     PSET
3186 39           Ø162Ø          RTS
3187              Ø163Ø N        RMB     1
3188              Ø164Ø NN       RMB     1
3189              Ø165Ø XX       RMB     1
318A              Ø166Ø YY       RMB     1
          3ØØØ    Ø167Ø          END     PMODE
```

Hint . . .

Cursor Controls

Memory location 63372 controls the blink rate of the cursor on the CoCo 3's 40- and 80-column text screens. Simply poke this location with any value from 0 to 255 to change the rate. The default value is 11. Lower values increase the blink rate while larger values make the cursor blink slower. If you want to stop the Hi-Res cursor from blinking altogether, enter POKE63381,0. To restart the blinking, enter POKE 63381,1.

Ken Ostrer
Vancouver, Washington

Hint . . .

HPRINT Shortened

When entering BASIC programs, I like to use the shorthand version of the PRINT command (typing a question mark instead of typing out PRINT). Unfortunately, if you try entering H? on the CoCo 3 (instead of HPRINT), you will get a syntax error upon running the program. To solve this problem, enter the entire listing using H?. Then save the listing in ASCII format and reload it. All H? commands will be changed to HPRINT.

Carl England
Calhoun, Georgia

Hint . . .

BASICally a Setup

In order to make using my CoCo a little easier, I saved a program on my utilities disk that sets the printer baud rate, drive selection and other parameters. To make things even simpler, I named the program *.BAS. Now when I want to start working, I just enter RUN"* and let the computer set itself up, much in the way an AUTOEXEC file works on MS-DOS systems.

Harold Grumann
Atlanta, Georgia

Smooth out those rough spots with a little help from CoCo

What's the Angle?

By Joseph Kolar
Rainbow Contributing Editor

Using the motion option of the CoCo's DRAW command, we have created some simple line drawings. Let us now soften the traditionally sharp edges of CoCo graphics by adding gentle curves to our creation.

For this demonstration, we will make a simple footprint — specifically the print of a man's right shoe. We will start with a rough sketch on graph paper. After we get a shape that pleases us, we will use our modified *Graph Paper* program to put the sketch on the CoCo screen.

Begin by choosing the dimensions of the shoe print. (For this demonstration, I chose 8-by-20 units.) Next, take a sheet of graph paper and outline an oblong that is eight boxes wide and 20 boxes long. Use a mark at the top of the oblong to divide the figure into two equal parts. Mark the oblong at two-block intervals along the left vertical line. For our purposes, the upper left-hand corner of this figure will be our point of origin (0,0). The tip of the shoe should be two units wide and centered.

As you sketch, you are also plotting your program line. First, move three units to the right and then make a two-unit pencil mark to the right (BR3R2). Move in a 135-degree angle for one unit (F). Our sketch widens gradually and should touch the right border of our oblong at the coordinates (8,9). If you draw a line to continue in this direction, you would have a sharp angle two units to the right and three units down, which translates to M+2,8 or M+2,+8.

Next, make your sketch curve toward the center by using a line that moves six units down and two units to the left (M-2,6). Now we need to add a heel to this figure. To be in proportion with the rest of the shoe, the heel should be four units long. Because we have five units to fill, start by moving down one unit. Now we will create the front of the heel. In order to be centered, the heel's line should be four units long (NL4). Next, move down three units (D3), and round the butt of the heel by by moving one unit at a 225-degree angle (G) and two units to the left.

(Are you sketching as we go? You should have one half of a shoe on your graph paper.)

To make the other side of the heel, move one unit at a 315-degree angle and four units up (HU4). We must now show an indentation for the instep. To do this, move in an angle that is four units up and one unit to the right (M+1,-4). Now widen the shoe until it touches the left boundary of your oblong by drawing a line that is four units up and three units to the left (M-3,-4).

As we return to the tip of the shoe, we must draw a line that moves in a 45-degree angle (E) and reaches the top boundary of our oblong at the coordinates (2,1). This will leave a gap that we can connect with a line six units up and two units to the right (M+2,-6).

This outline *should* look like a right shoe. Go over the outline in red ink, moving from point to point. Now, let's see what this looks like on the CoCo screen.

Load our *Graph Paper* program (September 1988, Page 80), and add the following line:

```
300 GOTO 300
```

We will need all 19 rows created on the screen and will need to modify the utility in the following manner:

Line 30: change 160 to 190 in both C$ and D$ strings.
Line 50: concatenate +A$+B$+A$.
Line 60: change 160 to 190 at all four occurrences.
Line 70: change C4 to C2, and change 160 to 190 in both occurrences.

Never hesitate to tailor an existing program to fit a new situation. In this tutorial, we need three more rows, and we want to change the border color to make our outline stand out. In a later, tutorial, we will create a full 256-by-192 screen.

You may want to make the following changes to our graph-paper utility: Add the contents of Line 90 to the end of Line 80, and separate with a colon. Put Line 90 in limbo with a REM. Now run the utility. If the program runs properly, delete Line 90.

(While we're modifying our utility, let me offer the solution to the last column's problem: Change all the 1s to 2s in lines 150 to 157.)

Back to the drawing board. *We* have a problem. We can only create 19 boxes in a vertical direction, but our shoe is 20 boxes long. How can we create our drawing on the screen? We could shorten the shoe length one unit. Where can we remove one unit on each side of the shoe? I suggest that we begin at Location (6,15) and remove one unit down. Run a zigzag pencil line over the red line one unit above the heel. On the other side of the shoe, make a zigzag line over its mate. These zigzag lines indicate that you must omit the marked segments when you are creating the program line. Now the shoe is 8-by-19 units.

Enter Line 95, which will remove all the unnecessary portions of the graph paper from the screen. This way, you can concentrate on converting your sketch into a shoe on the screen.

Using our shoe print we will begin creating the outline on the CoCo screen by typing the following line:

```
100 DRAW "C3S40BM0,0BR3R2F"
```

Then press ENTER and type RUN.

Next, press BREAK and type EDIT100. Press ENTER and X to move to the end of the line. Use the left arrow to move one space and remove the closing quote marks in Line 100. Type in M+2,8M-2,6", press ENTER and run. If your screen does not duplicate your sketch, look for an error in either the direction or the number of units. Now press BREAK.

Look at the sketch. We have reached the unit that we plan to omit. Edit Line 100, removing the closing quote as we did before. Now we need to move four units to the left and return to the move's

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

starting point (NL4). Next, we need to finish the heel D3GL2HU3). To do this, add the following to Line 100:

```
NL4D3GL2HU3"
```

Now press ENTER and run the program.

Complete the shoe by editing Line 100, removing the closing quotes and concluding the DRAW statement. Make sure that your statement omits the unit corresponding to the one we removed in our drawing. When you have finished, type RUN.

If your footprint is faulty, don't panic. Just refer to your sketch and correct your program line accordingly.

Look over your creation. Would you like to see it in a usable size (like Size 8)? If so, just type in the following lines:

```
98 GOTO 400
400 PMODE4,1:PCLS:SCREEN1,0
410 GOTO 100
```

Edit Line 100 to change S40 to S8. To do this, type EDIT100, and press ENTER. Use the space bar to move under the 4, press D (to delete 4) and C8 (to change the 0 to an 8). Now press ENTER to get out of the editing mode, and run the program.

Both sides of the sole come to a sharp point. We want gentler curves than this. Let's make a few modifications to our sketch. (After all, have you ever seen a drawing or a program you couldn't improve?)

First, let's return our shoe print to the graph-paper screen by masking Line 98 with REM and editing Line 100 by typing EDIT100 and pressing ENTER, moving the cursor under 8 and typing C4I0 to change 8 to 4 and insert 0. Now press ENTER and run the program.

(You may wish to study the points that are earmarked for modification.)

Begin at (6,0) and sketch a line that moves down six units and right two units, then moves down two more units. This changes M+2,8 to M+2,6D2. With a black pen, mark over the newly created pencil line.

"We will make a simple footprint starting with a rough sketch on graph paper, then using our modified* Graph Paper *program to put the sketch on the CoCo screen."

At Point (3,11), we will make a line that moves for three units in a 315-degree angle, and moves up one unit. Pencil it in. That changes M-3,-4 to H3U. Ink over the pencil line in black.

At this time, we have to modify Line 100 to incorporate these changes. If you look at your sketch, you will see that we need to modify the red portions of the sketch to the coordinates indicated by the black lines on the sketch. Note that the first change begins after F in Line 100.

Type EDIT100 and press ENTER. Use the space bar to move the cursor under 8. Type C6ID2 to change 8 to 6 and add D2 to the line. Now press ENTER and run the program.

You must go slowly when editing long DRAW statements because it is so easy to make a mistake. Therefore, we will make one set of changes, run the program to see if the outline is changing in the desired manner, and then move to the next change.

The next modification begins after the sequence, M+1,-4. Edit Line 100 by typing EDIT100 and pressing ENTER. Next, type S0, use the space bar to move the cursor under the M of M-3,-4, and then type 6DIH3U to delete the six-character move, M-3,-4, replacing it with H3U. Then press ENTER and run the program.

This should accentuate the instep a bit more. To see what we have, mask Line 98 and edit Line 100 to change S40 to S8. After you have done this, run the program. Now our shoe print looks like a shoe print.

How would our shoe look with the sole and heel painted? We want to paint the sole in scale eight (S8) — the size we plan to use in our next tutorial. Therefore, we must use the PMODE4,1 screen, (256,192), and determine our paint points by using PSET.

To locate a point for the sole, key in 110 PSET(10,10,1) and run. Now let's locate a point for the heel. Try typing in 120 PSET(34,8,1) and running the program. It doesn't work. Try reversing the coordinates and running it again. This time it works.

Convert Line 110 to a PAINT statement by typing the following:

```
EDIT110
HPAINT(10,10),1,1
```

Run it and then let's check the heel coordinates. Mask Line 110, and then

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edit Line 120 by typing in and running the following:

```
EDIT120
HPAINT(8,34),1,1
```

Finally, unmask Line 110 to see what the painted shoe print looks like.

We have created a shoe print that offers three options for the next tutorial. For practice, get back to the *Big Foot* screen. Mask lines 98,110 and 120, and change S8 to S40 in Line 100. Find the correct PAINT line coordinates and paint the heel and sole in color C1. We will use Line 101 for this PAINT statement. Key in Line 101 without the REM marker and run the listing. What if you wanted to use color C2? Try it and see why I chickened out. Your choices are unlimited.

(When you are finished practicing, put the REM marker back in Line 101.)

Now all we need to do is make the left shoe print. For practice, you could create the left shoe in the same way that we designed the right one.

There is a better way. Flip over your graph paper drawing of the right shoe. You should be able to see the red and black outlines through the paper. (If not, go over the lines again — this time pressing a little harder.

You may want to trace the two outlines onto the back of the paper in order to see the line more clearly. Be careful as you move from point to point. The top of the sole should be outlined in black. Connect the lower red portion and heel separator. And finally, use red ink to run a zigzag line over the units above the heel that we will omit.

The black outline should indicate the final modifications. In pencil, sketch a line at the top of the shoe that moves left three units. Sketch a similar line up from the leftmost point on the shoe. Your point of origin is where these two pencil points meet, and this is where you will begin your second drawing.

(Save a copy or two of your work at this point.)

There are other ways to proceed with this second print, so mark the point of origin as (0,0) and open up more working space on the graph paper screen by changing 82 to 172 in Line 95. Next, add the following line:

```
96 COLOR 1: LINE(82,0)-
(89,190),PSET,BF
```

We will use Line 105 to create the left shoe print. So begin the line by typing the following:

```
DRAW"C3S40BM90,0
```

Go ahead, Rembrandt, create. Copy from your new sketch. *Don't peek at the listing.* Work it out.

When you have completed your masterpiece, there is one slight problem. The shoes are reversed. How would you swap them? It's easy. Just swap the horizontal locating points in lines 100 and 105.

Now let's check out our shoes in PMODE4,1 by unmasking Line 98 and changing S40 to S8 in lines 100 and 105. Now run the listing.

We must move the right shoe print by changing the location of the vertical coordinate to 20 in Line 100.

Paint the prints any way you like, but compare the two prints when you have painted the soles, when you have painted the heels, and when you have painted both. (Next, you may want to try sketching a pair of women's shoes, 6-by-15 units, using the same procedure we have already used.) You may even want to make a copy of your work.

Now, allow me to give you a few suggestions for creating clearer work in less time. First, sketches and drawings stand out best when done on SCREEN1,0 of PMODE4,1.They are as sharply defined as possible on CoCo's high-resolution, two-color screen. Second, when possible, make the entire design one long, continuous line; try to put locating coordinates only in the program's first DRAW statement. This allows much faster execution than when the CoCo is forced to jump from one set of coordinates to another. It also saves on the time it would take to plot those new coordinates. It is easy to pick up a location from a long DRAW statement and know exactly where it is in the sequence of movements. Finally, if you must make long jumps to new areas, use the B DRAW option. It works well when plotting a picture on graph paper.

That's it for this month. Enjoy your new creative abilities — who knows what is next? With CoCo, the DRAW statement and your imagination, the possibilities are endless. □

The listing:

```
Ø 'BIGFOOT
5 CLEAR5ØØ
1Ø PMODE3,1:PCLS:SCREEN1,Ø
2Ø A$="D1ØR24Ø":B$="D1ØL24Ø"
3Ø C$="R1ØD19Ø":D$="R1ØU19Ø"
4Ø E$=A$+B$+A$+B$:F$=C$+D$+C$+D$
5Ø DRAW"C2BMØ,ØD1ØR24ØD1ØL24ØD1Ø
R24ØD1ØL24Ø"+E$+E$+E$+A$+B$+A$
6Ø DRAW"BMØ,ØR1ØD19ØR1ØU19ØR1ØD1
9ØR1ØU19Ø"+F$+F$+F$+F$+F$
7Ø DRAW"C2BMØ,ØR24ØD19ØL24ØU19Ø"
8Ø 'DRAW"C4BMØ,4ØR24ØD4ØL24ØD4ØR
24ØD4ØL24Ø"
9Ø 'DRAW"BM4Ø,ØD16ØR4ØU16ØR4ØD16
ØR4ØU16ØR4ØD16Ø"
95 COLOR1:LINE(82,Ø)-(24Ø,19Ø),P
SET,BF
96 'COLOR1:LINE(82,Ø)-(89,19Ø),P
SET,BF
98 'GOTO4ØØ
1ØØ DRAW"C3S4ØBMØ,ØBR3R2FM+2,6D2
M-2,6NL4D3GL2HU3M+1,-4H3UM+2,-6E
"
1Ø1 'PAINT(36,36),1,3:PAINT(36,1
82),1,3
1Ø5 'DRAW"C3S4ØBM9Ø,ØBR3R2FM+2,6
DG3M+1,4NL4D3GL2HU3M-2,-6U2M+2,-
6E"
11Ø 'PAINT(1Ø,1Ø),1,1
12Ø 'PAINT(8,34),1,1
3ØØ GOTO3ØØ
4ØØ PMODE4,1:PCLS:SCREEN1,Ø
41Ø GOTO1ØØ
```

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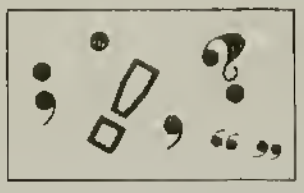

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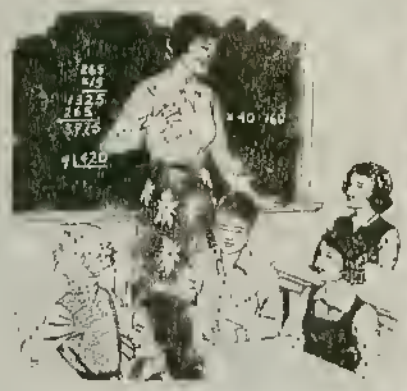

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Use these routines to let your CoBBS system upload and download Xmodem protocol

CoBBS Xmodem Routines

By Robert John Grubb

The *Color BBS System* (*CoBBS*) by Richard Duncan (November 1985, Page 135) is one of the best BBS systems for the Disk BASIC CoCo. However, as the system is written, it has no reliable way of sending and receiving machine language, or packed BASIC programs. To remedy this, I have written two machine language routines that allow *CoBBS* to upload and download using the Xmodem protocol. With these routines, the system can send or receive 100 blocks of data before loading more information or saving the information to disk. At 1200 baud, the system can send or receive one block per second.

Both routines will run on either a CoCo 2 or 3. I have added REMs to mark the lines that are specific to each computer. The programs are written for the CoCo 3 using ON ERR GOTO. When running the programs on a CoCo 2, change those commands to RUN T.

To allow *CoBBS* to run these new routines, a few lines in the main *CoBBS* program must be changed. Delete lines 1200 to 1290 and 20440 to 20950, and add the following lines:

```
1200 POKE&H7E00,B:POKE&H7E01,
TD:POKE&H7E02,ZK:POKE&H7E03,
ZD:FORX=&H0 TO &H3:A$=MID$
(D$,X+1),1):A=ASC(A$):POKE(&H7
E04+X),A:NEXTX
1205 TR$=TR$+"DOWN":GOSUB
9615:PRINT"Loading Download
Protocols.":PRINT"Please
wait . . .":LOAD"XMSEND/SYS",R
1321 CLS:PRINT"1 - ASCII"
:PRINT"2 - Xmodem":PRINT"3
- Press <CR> to exit"
1322 GOSUB600:ON ERRGOTO1300
:X=VAL(CH$):IFX=0THENRETURN
ELSE IF X>0 OR X<3THEN PRINT
TAB(3)CH$ELSE1322
1323 IF X=2 THENPOKE&H7E00,
TD:LOAD"XMRECV/SYS",R
```

Make sure you make these changes to CDBBS.SYS from a freshly powered-up computer *after* a PCLEAR1 statement, or you will lose some of the programming when you save it to disk.

Receiving Uploads

XMRECV.SYS lets you receive uploads to *CoBBS*. When users first enter into this routine, they are prompted to press ENTER to continue. Line 40 contains a password that you, as SysOp, should choose. Any user who enters the correct password at this time can get a directory listing on all your drives. The user can then upload any file to any disk; and if that user uploads a file already on the disk, *the file is overwritten*.

If the correct password is entered, the screen will prompt File to U/L:. The user should then enter an eight-character filename. Next, the prompt EXT: will ask for a three-character

Robert Grubb enjoys using his CoCo's for MIDIing his synthesizers, running a BBS, and playing games with his two sons. He enjoys programming in BASIC and machine language. Currently, he is working on an OS-9 Level II BBS system.

extension. Finally, the routine asks for the drive number (zero to three). The routine now tells the user to start sending. The host computer's screen clears, and shows the number of blocks received until the upload is finished.

To get a directory listing and granule count, the user types DIR (upper or lower case) for the filename and ENTER for the extension. The user then enters the desired drive number. At the end of the listing, the system identifies the number of free grans left on that disk.

If the user does not enter the correct password, the system identifies the number of free grans and asks for a *filename only*. The system takes this name, adds the extension /XUP to that filename and puts the file on the drive specified in the data line of the *CoBBS* menu.

When the upload is complete, the system asks the user if another file will be uploaded. If so, then the system reruns the program. XMRECV.SYS is a program that asks the user to type U to upload [See "*CoBBS*: A Look at the Commands," December '85, Page 153]. XMRECV.SYS has the same data types as the ASCII version of *CoBBS* with one exception: While entering the correct password gives users full access to all disks, without this password users may upload only filenames with the extension /XUP.

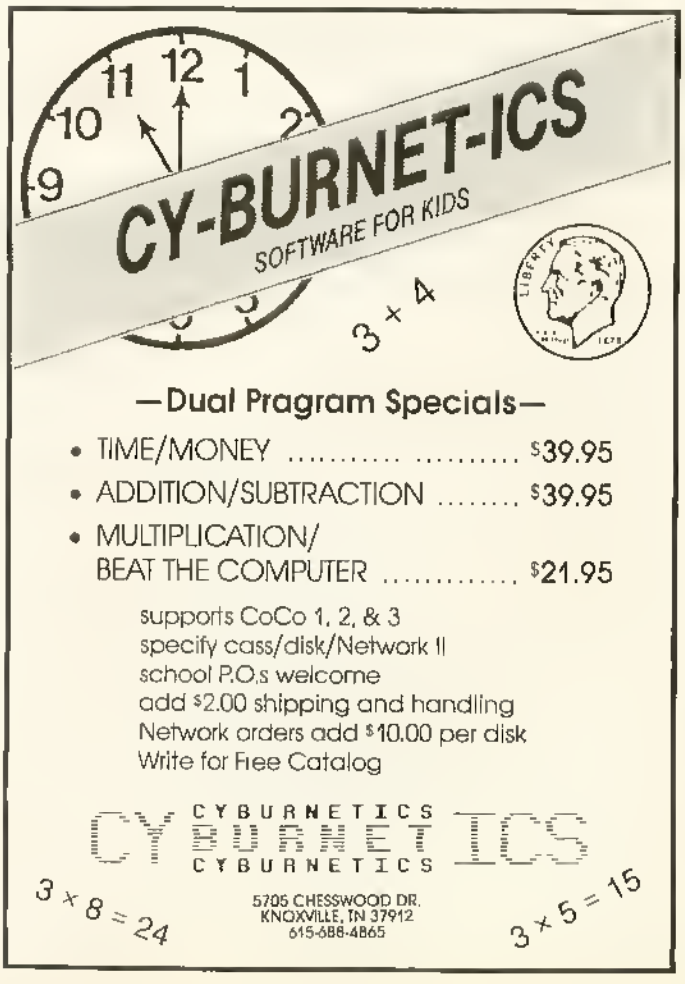
All uploaded programs are saved as ASCII files on the disk. As SysOp, you can change the filenames to names that can be downloaded without problem. If you want to run the programs on your CoCo, convert them to the proper type (i.e., .BIN, or .BAS) before you can run them. In the listings you will find a public domain file, FCONV.BAS, that will convert files for you. The file includes instructions.

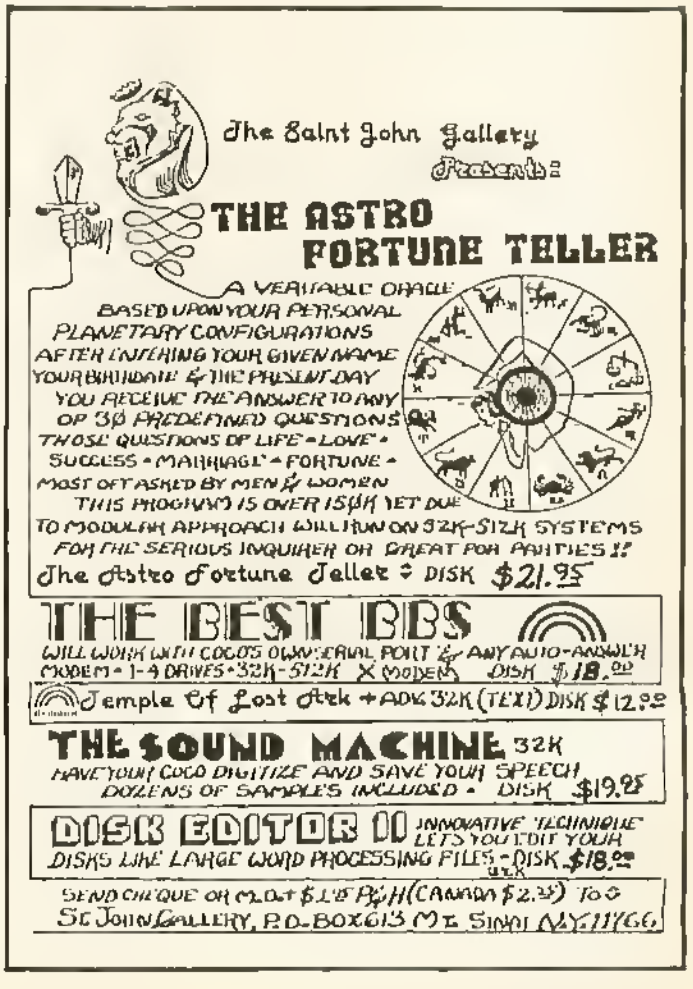
XMRECV.ASM is the source code to the machine language routine used by XMRECV.SYS. I assembled it on the Radio Shack Disk *EDTASM+* assembler. Type it in and assemble it to the *CoBBS* system disk as XMRECV.BIN.

Those of you who do not have an assembler can type in the BASIC pro-

Listing 1: XMRECV.ASM

```
                        00005          TITLE   XMRECV/BIN (C) 1986 JOHN CRUBB
                        00010 ****************************************
                        00020 * XMRECV/BIN FOR THE CoBBS XMRECV/SYS *
                        00030 * XMODEM TRANSFERS. COPYRIGHT 1986 (C)*
                        00040 *              JOHN CRUBB              *
                        00050 *             RT 4 BOX 309             *
                        00060 *           GALLIPOLIS, OHIO           *
                        00070 *                45631                 *
                        00080 *         PHONE (614)-446-7439         *
                        00090 ****************************************
                        00100 * YOU MAY USE THIS PROGRAM WITHOUT     *
                        00110 * CHARGE AS LONG AS ALL CREDITS       *
                        00120 * REMAIN INTACT.                      *
                        00130 ****************************************
                        00140 * YOD MUST USE THIS PROGRAM WITH THE  *
                        00150 * BASIC PROGRAM "XMRECV/SYS" AS THE    *
                        00160 * PROGRAMS EXPECT DATA FROM EACH       *
                        00170 * OTHER. THESE PROGRAMS ARE EASILY     *
                        00180 * MODIFIED FOR YOUR PERSONAL USE...    *
                        00190 ****************************************
7E00                    00200          ORG     $7E00
                        00210 *********V 1.01**********
```



gram, XMRECPK.BAS. This file will poke the values into upper RAM and save it to your disk. I have included checksums so that any mistakes may be identified by the line number.

Sending Files

XMSEND.SYS lets you send programs via Xmodem. This file uses the same kinds of menus as the ASCII version. In this manner, *the system* remains virtually the same as it was originally set up by Richard Duncan. Therefore, you do not have to relearn how to set up downloads for your system.

On your *CoBBS* menu, press D to download. The data specification is 0COCO. The buffer number is 0, which means that the user's buffer is not opened and closed automatically. If the buffer number is 1 instead, the buffer opens, the directory is listed and the buffer is then closed. COCO is a four-character filename, in front of which the system adds DOWN, and at the end of which it adds /MNU. Therefore, the system searches all drives to locate a menu called DOWNCOCO/MNU.

The buffer numbers 3 and 4 change the data to BDPxxx, where B identifies the download type; D identifies the drive from which to download; and P allows no downloads of files with the extensions /SYS, /BIN or /BAK. When the buffer number is 3, the user can download only from the drive specified. When it is 4, the user has full access to all drives. The buffer numbers 3 and 4 allow the user to type DIR to get a directory on any drive.

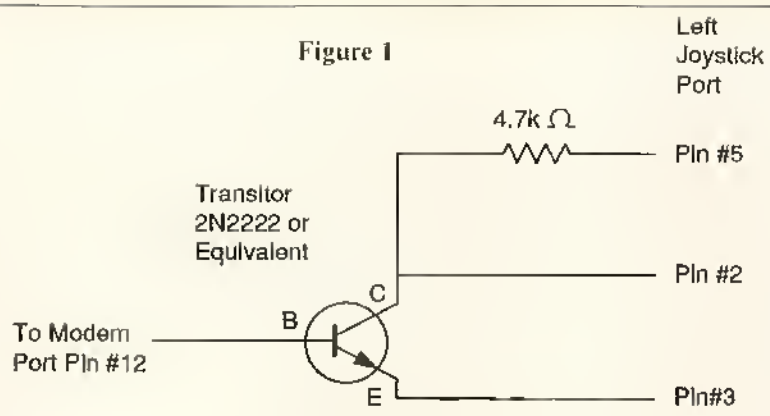
When the variable B is either 3 or 4, the computer screen will prompt File to D/L:. At this time, the user should enter the eight-character filename and extension to be downloaded. The system then asks for a drive number. If the file exists on that drive, the user is prompted for download type (i.e., ASCII/buffer control, ASCII/no buffer control, or Xmodem). If Xmodem is selected, the system does a block count and asks if the user wants to continue. (The system offers several places to abort in case users change their minds.) The system then goes to Receive mode and begins sending the program. If Variable B is either 0 or 1, the system displays the menu and then asks for the number to download. Once the system makes sure the file exists, it performs in the same manner as when 3 or 4 is the buffer code.

The ASCII transfers are the same as in the original *CoBBS* system.

Because the system takes the number

```
7E00                    0022 BUFFER  RMB     128
7E80                    0023 COUNT   RMB     1
7E81                    0024 BLKIN   RMB     1
7E82                    0025 RECOM   RMB     1
7E83                    0026 CHKSU   RMB     1
7E84 86   00            0027 INIT    LDA     #$0
7E86 5F                 0028         CLRB
7E87 6F   8C F6         0029         CLR     COUNT,PCR
7E8A 30   8D FF72       0030         LEAX    BUFFER,PCR
7E8E A7   80            0031 LOOP1   STA     ,X+     *CLEAR OUT THE BUFFER
7E90 5C                 0032         INCB
7E91 C1   80            0033         CMPB    #128    *END OF BUFFER?
7E93 26   F9            0034         BNE     LOOP1   *NOPE? GO FINISH
                        0035 *******START RECEIVE******
7E95 86   15            0036 REC     LDA     #21     *SEND ORIGINAL NAK
7E97 17   0066          0037         LBSR    SEND    *GO SEND IT
7E9A B6   00            0038         LDA     #0
7E9C A7   8D 00A8       0039         STA     TIMER,PCR       *RESET TIMER
7EA0 CE   0000          0040 TRIP    LDU     #0      SET TIMER TO 0
7EA3 17   007C          0041         LBSR    RECEV
7EA6 81   01            0042         CMPA    #1      *IS IT START OF BLOCK?
7EA8 27   19            0043         BEQ     BLOCK   *YES? GO GET REST
7EAA B7   7FFE          0044         STA     $7FFE   *SAVE IT
7EAD 81   1B            0045         CMPA    #24     *ABORT??
7EAF 27   53            0046         BEQ     EXIT    *THEN QUIT
7EB1 81   04            0047         CMPA    #4      *END OF FILE?
7EB3 27   4F            0048         BEQ     EXIT    *THEN QUIT
7EB5 6C   8D 00BF       0049         INC     TIMER,PCR       *INCREASE TIMER
7EB9 A6   8D 00BB       0050         LDA     TIMER,PCR
7EBD 81   FF            0051         CMPA    #$FF    *IS IT 255?
7EBF 26   DF            0052         BNE     TRIP    *NO? GO ADD MORE TO TIMER
7EC1 20   D2            0053         BRA     REC
                        0054 ************GET BLOCK*****************************
7EC3 17   004A          0055 BLOCK   LBSR    RECEV1
7EC6 A7   8C 88         0056         STA     BLKIN,PCR       *BLOCK #
7EC9 17   0044          0057         LBSR    RECEV1
7ECC A7   8C B3         0058         STA     RECOM,PCR       COMPLEMENT
7ECF 30   8D FF2D       0059         LEAX    BUFFER,PCR      *BUFF ADDRESS
7ED3 17   003A          0060 LOOP2   LBSR    RECEV1  *GET CHARACTER
7ED6 A7   80            0061         STA     ,X+     *PUT IN BUFFER
7ED8 6C   8C A5         0062         INC     COUNT,PCR       *KEEP TRACK
7EDB A6   8C A2         0063         LDA     COUNT,PCR       *TILL END
7EDE 81   80            0064         CMPA    #128    *OF BUFFER
7EE0 26   F1            0065         BNE     LOOP2   *GET NEXT CHARACTER
7EE2 17   0028          0066 CKSUM   LBSR    RECEV1  *GO GET CHECK
7EE5 A7   8C 9B         0067         STA     CHKSU,PCR       *SUM
                        0068 **********CONPUT CHECK SUM*********************
7EE8 30   8D FF14       0069         LEAX    BUFFER,PCR      *POINT BUFFER
7EEC 5F                 0070         CLRB            *SET UP COUNTER
7EED A6   80            0071         LDA     ,X+     *GET CHARACTER
7EEF 5C                 0072 LOOP3   INCB            *ADD TO COUNT UNTIL
7EF0 C1   80            0073         CMPB    #128    *END OF
7EF2 27   04            0074         BEQ     RESEND  *BUFFER THEN QDIT
7EF4 AB   80            0075         ADDA    ,X+     *ADD TO CHECKSUM
7EF6 20   F7            0076         BRA     LOOP3   *GET NEXT
7EF8 A1   8C 88         0077 RESEND  CMPA    CHKSU,PCR
7EFB 27   07            0078         BEQ     EXIT    *ON MATCH LEAVE
7EFD 86   15            0079         LDA     #21     *SEND NAK NEXT
7EFF B7   7E96          0080         STA     REC+1   *PUT IN PGM
7F02 20   80            0081         BRA     INIT    *RESEND BLOCK
7F04 39                 0082 EXIT    RTS
7F05 F6   FF69          0083 SEND    LDB     $FF69   *CHECK STATUS OF PAK
7F08 C4   10            0084         ANDB    #$10    *IS PACK READY TO SEND?
7F0A 27   F9            0085         BEQ     SEND    *NOPE, TRY AGAIN
7F0C B7   FF68          0086         STA     $FF68   *YES, SEND IT.
7F0F 39                 0087         RTS
7F10 B6   FF69          0088 RECEV1  LDA     $FF69   *CHECK STATUS OF PAK
7F13 84   20            0089         ANDA    #$20    *CARRIER??
7F15 26   28            0090         BNE     NOC     *NOPE? GO TELL BASIC AND EXIT
7F17 B6   FF69          0091         LDA     $FF69   *SEE IF PACK HAS A CHR?
7F1A 84   08            0092         ANDA    #$8
7F1C 27   F2            0093         BEQ     RECEV1  *NOPE, TRY AGAIN
7F1E B6   FF68          0094         LDA     $FF68   *YES, GET IT
7F21 39                 0095         RTS
7F22 B6   FF69          0096 RECEV   LDA     $FF69   *CHECK STATUS OF PAK
7F25 84   08            0097         ANDA    #$08
7F27 27   04            0098         BEQ     CARIER  *NOPE? GO CHECK CARRIER
7F29 86   FF68          0099         LDA     $FF68   *LOAD IT
7F2C 39                 0100         RTS
7F2D B6   FF69          0101 CARIER  LDA     $FF69   *CHECK STATUS OF PAK
7F30 84   20            0102         ANDA    #$20    *CHECK CARRIER
7F32 26   0B            0103         BNE     NOC     *NOPE? GO TELL BASIC AND EXIT
7F34 B6   00            0104         LDA     #0
7F36 33   41            0105 JUNK    LEAU    +1,U
7F38 1183 0050          0106         CMPU    #$50    *END OF BUFFER?
7F3C 26   E4            0107         BNE     RECEV   *NO? GET SOME MORE
7F3E 39                 0108         RTS
7F3F 86   1B            0109 NOC     LDA     #24     * LOAD REGISTER THEN
7F41 B7   7FFE          0110         STA     $7FFE   *SEND IT TO BASIC PROGRAM
7F44 20   0E            0111         BRA     EXIT
7F46 32   7E            0112         LEAS    -2,S
7F48                    0113 TIMER   RMB     1
          0000          0114         END

00000 TOTAL ERRORS
```



Joystick modification for 1200 baud modem detection.
Modem must support Pin 12 high speed indication.

Listing 2: XMSEND.ASM

```
                    0000          TITLE   XMSEND/BIN (C) 1986 John Grubb
                    0010 ****************************************
                    0020 * XMSEND/BIN FOR THE CoBBS XMSEND/SYS *
                    0030 * XMODEM TRANSFERS. COPYRIGHT 1986 (C)*
                    0040 *                JOHN GRUBB            *
                    0050 *             RT 4, BOX 309            *
                    0060 *            GALLIPOLIS, OHIO          *
                    0070 *                  45631               *
                    0080 *          PHONE:(614)-446-7430        *
                    0090 ****************************************
                    0100 * YOU MAY USE THIS PROGRAM WITHOUT    *
                    0110 * CHARGE AS LONG AS ALL CREDITS       *
                    0120 * REMAIN INTACT.                      *
                    0130 ****************************************
                    0131 * YOU MUST USE THIS PROGRAM WITH THE  *
                    0132 * BASIC PROGRAM "XMSEND/SYS" AS THE   *
                    0133 * PROGRAMS EXPECT DATA FROM EACH      *
                    0134 * OTHER. THESE PROGRAMS ARE EASILY    *
                    0135 * MODIFIED FOR YOUR PERSONAL USE...   *
                    0136 ****************************************
7E00                0140          ORG     $7E00
                    0150 ******** GET INFO FROM BASIC ********
7E00 10EF 8D 0118   0160          STS     STACK,PCR       *STORE STACK POINTERS
7E05 8D   B3ED      0170          JSR     $B3ED           *GET PARAMETERS FROM BASIC
7E08 1F   02        0180          TFR     D,Y             *MOVE TO Y
7E0A E6   A4        0190          LDB     ,Y              *LENGTH OF STRING
7E0C AE   22        0200          LDX     2,Y             *GET STRING LOCATION
7E0E C1   80        0210          CMPB    #$80            *128 BYTES?
7E10 1026 00EB      0220          LBNE    ERR1            *NO? THEN GO REPORT
7E14 5F             0230          CLRB
7E15 6F   8D 0103   0240          CLR     TRIES,PCR       *CLEAR RETRIES
                    0250 ********** SETUP FOR BLOCK HEADER DATA *******
7E19 86   01        0260 SETUP    LDA     #$1             *<SOH>
7E1B 8D   5C        0270          BSR     SETSND          *SEND IT
7E1D A6   8D 00FA   0280          LDA     BLOCK,PCR       *GET BLOCK NUMBER
7E21 8D   56        0290          BSR     SETSND          *SEND IT
7E23 88   FF        0300          EORA    #$FF            *COMPLIMENT OF BLOCK NUMBER
7E25 8D   52        0310          BSR     SETSND          *SEND IT
7E27 5F             0320          CLRB
7E28 CE   0000      0330          LDU     #$0             *LOAD U TO
7E2B EF   8D 00EA   0340          STU     CHKSU,PCR       *CLEAR CHKSUM
                    0350 ******** SEND THE BLOCK ***************
7E2F A6   80        0360 SNDBLK   LDA     ,X+             *LOAD STRING BYTE
7E31 8D   46        0370          BSR     SETSND          *SEND IT
7E33 34   04        0380          PSHS    B
7E35 34   02        0390          PSHS    A
7E37 4F             0400          CLRA
7E38 34   02        0410          PSHS    A
7E3A EC   8D 00DB   0420          LDD     CHKSU,PCR       *GET CHECKSUM
7E3E E3   E1        0430          ADDD    ,S++            *ADD BYTE TO IT
7E40 ED   8D 00D5   0440          STD     CHKSU,PCR       *NOW SAVE IT
7E44 35   04        0450          PULS    B
7E46 5C             0460          INCB
7E47 C1   80        0470          CMPB    #$80            *IS IT 128 BYTES?
7E49 27   07        0480          BEQ     ENDBLK          *THEN GO SEND CHECKSUM
7E4B 20   E2        0490          BRA     SNDBLK          *GO SEND REST OF BLOCK
                    0500 ******** SEND THE CHECKSUM ***************
7E4D A6   8D 00C9   0510 ENDBLK   LDA     SUM,PCR         *GET LAST 8 BYTES OF CHECKSUM
7E51 8D   26        0520          BSR     SETSND          *AND SEND IT
7E53 8D   69        0530          BSR     SETREC          *GO WAIT FOR ANSWER
7E55 81   06        0540          CMPA    #$6             *IS IT <ACK>?
7E57 26   09        0550          BNE     RESND           *NO? SEND LAST BLOCK AGAIN
7E59 6F   8D 00BF   0560          CLR     TRIES,PCR       *CLEAR TRIES, AND GO FOR NEXT BLO
```

entered by the user and adds COCO to the front and /DDW to the end of that number, you will need to make a text file called DDWNCOCO/MNU that lists a number, program name and a description of that program. If a user enters I for download, the system looks on all drives for a file named COCO1/DDW. If the system locates that filename, it asks for the type of download (ASCII or XModem). From that point, the system prompts the user throughout the procedure.

XMSEND.ASM is the source code to the program XMSEND.BIN, which is used by XMSEND.SYS. Assemble it to your system disk as XMSEND.BIN. As with the other source code program, if you don't have an assembler, type in the program XMSNDPK.BAS. It will poke the routine in high RAM and then save it to disk.

1200-Baud Modification

In this article, I have included a schematic (Figure 1) describing the use of a transistor in determining the baud rate of a modem with a High Speed Indication Line (Pin 12 on the modem). This information is read by *CoBBS* through the left joystick port, and the entire circuit will fit inside the joystick plug. Cut Line 12 in the DB25 cable, which connects the modem to the RS-232 pack, and send it to the circuit. Next, change Line 40 in the USER.SYS program to read as follows:

```
40 CLS:EXEC&H100A:POKE4657,0
:GOSUB10035
```

Add the following lines:

```
10035 IF JOYSTK(0)<30 THEN
POKE 65387,56:PRINT"CONNECTED
AT 1200 BAUD":FOR X=1 TO 900:
NEXTX:RETURN
10036          POKE65387,54:PRINT"
CONNECTED          AT     300
BAUD":FORX=1TO900:NEXTX:RETURN
10037 GOTO10035
```

You may have to play with the value returned by JOYSTK(0) to find the best value for your modem.

Enjoy these programs. If there are any problems, I can be reached on Delphi (username GRUBBY), or call my BBS at (614) 446-7430. I am online Friday through Sunday, from 6 p.m to 11:30 p.m., at 300/1200 baud 8-bit, 1 stop bit, no parity.

(Questions or comments about the programs may also be directed to the author at Route 4, Box 309, Gallipolis, OH 45631. Please enclose an SASE when requesting a reply.) □

Hint . . .

What's in Memory?

Until you type the DOS command, the computer's memory is mostly concerned with Color Computer BASIC. Once the DOS command calls the OS-9 operating system into action, the computer memory locations take in all sorts of procedures. When you use the `mdir` (module directory) command, a screen display of all modules now in memory appears.

Some of the modules listed on your screen are identical to those you will find in the CMDS (commands) directory of your OS-9 system disk. For instance, such often-used commands as del (delete), `list` and `load` are in memory and also available on the disk in the CMDS directory. But an infrequently used command like backup is found only on the disk.

Other modules listed to the screen when you use the `mdir` command are not on your disk. Most such modules are not usually commands, and thus not executable. Most of them relate to OS-9 system functions.

You can load commands into memory using the `load` command. For instance, if you type `load backup`, then the backup command enters memory as a module along with the other 50 or more modules. It stays there until you type `unlink backup`.

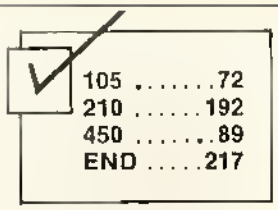
When you use the backup command without first loading it into memory, it is automatically loaded into memory, does its backup work, and then is automatically *unlinked* to remove itself from memory. If these things are done automatically, then why ever load backup into memory?

When you buy an OS-9-driven commercial program (say, a game), the backup command is not likely to be on the disk. You could then load backup into memory from your system disk, replace it with your new game disk, and then call for a backup, running it from memory. You should unlink backup once the job is finished.

Del Turner, Kamloops, BC

```
CK
7E5D 4F             00570       CLRA
7E5E 5F             00580       CLRB
7E5F 16   00A0      00590       LBRA    EXIT            *GO RETURN TO BASIC
                    00600 ******* NOT ACK, RESET BLOCK AND SEND IT
7E62 30   88 80     00610 RESND LEAX    -$80,X          *RESET START OF BLOCK
7E65 6C   8D 0083   00620       INC     TRIES,PCR       *ADD 1 TO TRIES
7E69 34   02        00630       PSHS    A
7E6B A6   8D 00AD   00640       LDA     TRIES,PCR
7E6F 81   06        00650       CMPA    #$6             *IS IT 6 RETRIES?
7E71 1020 009F      00660       LBGE    ERR4            *IF SO, GO
7E75 35   02        00670       PULS    A
7E77 20   A0        00680       BRA     SETUP
                    00690 ****** SET UP TO SEND DATA ************
7E79 34   02        00700 SETSND PSHS   A               *PUT ON STACK
7E7B 34   40        00710       PSHS    U
7E7D CE   0000      00720       LDU     #$0
7E80 EF   8D 009A   00730       STU     COUNT,PCR       *CLEAR COUNTER
7E84 6F   8D 0095   00740       CLR     TIMER,PCR       *CLEAR TIMER
7E88 35   40        00750       PULS    U
7E8A B6   FF69      00760 SEND0 LDA     $FF69
7E8D 84   10        00770       ANDA    #$10            *IS PAK READY?
7E8F 27   06        00780       BEQ     CONT1           *NOPE
7E91 35   02        00790       PULS    A               *PULL FROM STACK
7E93 B7   FF68      00800       STA     $FF68           *AND SEND IT
7E96 39             00810       RTS
                    00820 ******* TIME OUT ROUTINE FOR SENDING BLOCK
7E97 34   10        00830 CONT1 PSHS    X
7E99 AE   8D 00B1   00840       LDX     COUNT,PCR       *LOAD COUNTER
7E9D 30   01        00850       LEAX    1,X             *ADD 1 TO IT
7E9F AF   8D 007B   00860       STX     COUNT,PCR       *SAVE IT
7EA3 27   04        00870       BEQ     TIMER1          *IF OVER 255 THEN ADD TO TIMER
7EA5 35   10        00880       PULS    X
7EA7 20   E1        00890       BRA     SEND
7EA9 34   04        00900 TIMER1 PSHS   B
7EAB E6   8D 006E   00910       LDB     TIMER,PCR       *LOAD TIMER
7EAF 5C             00920       INCB                    *ADD 1 TO IT
7EB0 C1   03        00930       CMPB    #$3             *3 TIME OUTS?
7EB2 27   56        00940       BEQ     ERR2            *GO REPORT IT
7EB4 E7   8D 0065   00950       STB     TIMER,PCR       *SAVE IT
7EB8 35   04        00960       PULS    B
7EBA 35   10        00970       PULS    X
7EBC 20   CC        00980       BRA     SEND
                    00990 ******* SET UP TO RECV A BYTE *****
7EBE 34   40        01000 SETREC PSHS   U
7EC0 CE   0000      01010       LDU     #$0
7EC3 EF   8D 0057   01020       STU     COUNT,PCR       *CLEAR COUNTER
7EC7 6F   8D 0052   01030       CLR     TIMER,PCR       *CLEAR TIMER
7ECB 35   40        01040       PULS    U
7ECD B6   FF69      01050 RECV  LDA     $FF69
7ED0 84   08        01060       ANDA    #$8             *ANYTHING IN PAK?
7ED2 27   04        01070       BEQ     CONT2           *NO, ADD TO TIMER
7ED4 B6   FF68      01080       LDA     $FF68           *LOAD IT
7ED7 39             01090       RTS
                    01100 ******* TIME OUT ROUTINE FOR RECEIVEING ACK
7ED8 34   10        01110 CONT2 PSHS    X
7EDA AE   8D 0040   01120       LDX     COUNT,PCR       *LOAD COUNTER
7EDE 30   01        01130       LEAX    1,X             *ADD 1 TO IT
7EE0 AF   8D 003A   01140       STX     COUNT,PCR       *SAVE IT
7EE4 27   04        01150       BEQ     TIMER2          *OVER 255, THEN ADD TO TIMER
7EE6 35   10        01160       PULS    X
7EE8 20   E3        01170       BRA     RECV
7EEA 34   04        01180 TIMER2 PSHS   B
7EEC E6   8D 002D   01190       LDB     TIMER,PCR       *LOAD TIMER
7EF0 5C             01200       INCB                    *ADD 1 TO IT
7EF1 C1   15        01210       CMPB    #$15            *IS IT OVER $15?
7EF3 2C   1A        01220       BGE     ERR3            *GO REPORT IT
7EF5 E7   8D 0024   01230       STB     TIMER,PCR       *ELSE SAVE IT
7EF9 35   04        01240       PULS    B
7EFB 35   10        01250       PULS    X
7EFD 20   CE        01260       BRA     RECV
                    01270 ******* SET UP FOR ERROR REPORTS
7EFF 4F             01280 ERR1  CLRA
7F00 C6   01        01290       LDB     #$1             *STRING ERROR
                    01300 **** NEXT STATEMENT SENDS DATA BACK TO BASIC'S VARPTR
7F02 10EE 8D 0019   01310 EXIT  LOS     STACK,PCR       *RESTORE POINTERS
7F07 7E   B4F4      01320       JMP     $B4F4           *PUT PARAM BACK TO BASIC
7F0A C6   0002      01330 ERR2  LDB     #$2             *COMMUNICATIONS FAILURE
7F0D 20   F3        01340       BRA     EXIT
7F0F C6   0003      01350 ERR3  LDB     #$3             *XMODEM TIME OUT
7F12 20   EE        01360       BRA     EXIT
7F14 C6   0004      01370 ERR4  LDB     #$4             *6 RETRIES ATTEMPTED
7F17 20   E9        01380       BRA     EXIT
                    01390 ******* PROGRAM VARIABLES ***************
7F19                01400 CHKSU RMB     1
7F1A                01410 SUM   RMB     1
7F1B                01420 BLOCK RMB     1               *POKED IN BY BASIC PROGRAM
7F1C                01430 TRIES RMB     1
7F1D                01440 TIMER RMB     1
7F1E                01450 COUNT RMB     2
7F20                01460 STACK RMB     2
          0000      01470       END

00000 TOTAL ERRORS
```



Listing 3: XMRECV.SYS

```
Ø 'XMRECV.SYS V2.1
1 'COPYRIGHT 1986 BY JOHN GRUBB
2 'PROGRAM TO ALLOW UPLOADS TO T
HE
3 'COBBS BBS SYSTEM
4 'MUST USE XMRECV/BIN WITH THIS
 PROGRAM
1Ø ON ERR GOTO 44Ø
15 FS=PEEK(&H7EØØ)
2Ø CLEAR 15ØØØ,&H7BFE:EC=Ø:PRINT
CHR$(12):'CHANGE CLEAR TO CLEAR
15ØØ,&H7ØØØ FOR COCO II VERSION
25 DIM RC$(1ØØ)
3Ø PRINT"CoBBS Xmodem Uploader V
2.1":PRINT"By John Grubb":PRINT"
Copyright 1986":PRINT:PRINT:PRIN
T"Please press RETURN to continu
e...";:PRINTCHR$(7)
4Ø PW$="PASSWORD"
5Ø LINEINPUTP$:IF P$<>PW$ THEN G
OTO 14Ø
6Ø FT$="":EX$="":D$=""
7Ø LINEINPUT"File to U/L: ";FT$:
IFLEN(FT$)>8THENPRINTCHR$(7):GOT
O7Ø
8Ø LINEINPUT"         EXT: ";EX$:
IFLEN(EX$)>3THENPRINTCHR$(7):GOT
O8Ø
9Ø LINEINPUT"    DRIVE #: ";D$:D
=VAL(D$):IF D<Ø OR D>3 THENPRINT
CHR$(7):GOTO9Ø
1ØØ IF LEFT$(FT$,3)="DIR" OR LEF
T$(FT$,3)="dir" THEN11ØELSEIFFT$
=""THEN44Ø
1Ø5 F$=FT$+"/"+EX$+":"+D$:GOTO21
Ø
11Ø IF D=1 THEN DIR1:GOTO13ØELSE
IFD=2 THEN DIR2:GOTO13Ø
12Ø IF D=Ø THEN DIRØELSEDIR3
13Ø PRINT"Free Grans: ";:PRINTFR
EE(D):GOTO6Ø
14Ø ON ERR GOTO6ØØ:PRINT"Checkin
g free disk space. Please wait..
."
15Ø X=FREE(FS):IF X<5 THENPRINT"
Sorry, Disk is FULL!...":PRINTCH
R$(7):GOTO44Ø
16Ø PRINT X;" Grans Free"
17Ø ON ERR GOTO 6ØØ
18Ø PRINT"Filename (8 Chars or l
ess). Do not use ";CHR$(34);"/";
CHR$(34);")":PRINT"Enter nothing
 to ABORT"
19Ø LINEINPUT"FILENAME >>";F$:IF
 F$="" THEN PRINT"Aborted":GOTO4
4Ø
195 IF INSTR(F$,"/")>Ø THEN 6ØØ
ELSE IFINSTR(F$,".")>Ø THEN 6ØØ
2ØØ F$=F$+"/XUP:"+RIGHT$(STR$(FS
),1):ON ERR GOTO21Ø:OPEN"I",#1,F
$:CLOSE:PRINT"I have that....":G
OTO14Ø
21Ø ON ERR GOTO 44Ø:A$=" ":POKEV
ARPTR(A$),&H8Ø:POKEVARPTR(A$)+2,
&H7E:POKEVARPTR(A$)+3,Ø
22Ø POKE&H7FFE,Ø:POKE&H7E96,21
23Ø CLS
24Ø OPEN"O",#1,F$:BL=Ø:ON ERR GO
TO 42Ø
25Ø PT=PEEK(&HFF22)AND1:IFPT=1TH
EN26ØELSEPRINT#-2,"Uploaded ";F$
26Ø LOADM"XMRECV/BIN":POKE&H7E96
,21
27Ø PRINT"Begin file transmissio
n.":PRINT"On MIKEY TERM press <D
OWNARROW> <3>."
28Ø CLS2:FORX=1TO8ØØØ:NEXTX:GOSU
B875
29Ø RD=Ø:T=Ø
3ØØ GOSUB 54Ø
31Ø FORX=1TO2ØØØ:NEXTX
32Ø EXEC&H7E84
33Ø A=PEEK(&H7FFE)
34Ø IF A=24 OR A=13 THEN 38Ø
35Ø IF A=4 THEN 49Ø
36Ø GOSUB 45Ø
37Ø POKE &H7E96,6:GOTO 32Ø
38Ø GOSUB 57Ø
39Ø IF BL=Ø THEN 41Ø
4ØØ FOR X=1 TO BL:PRINT#1,RC$(X)
;:NEXT X
41Ø CLOSE#1:CLEAR 2ØØ,&H7FFE:GOS
UB885
42Ø FOR X=1 TO 5:PRINTCHR$(7);:N
EXT X
43Ø GOSUB7ØØ:LINEINPUT"Upload an
other (Y/N)";Q$:IF LEFT$(Q$,1)="
Y" OR LEFT$(Q$,1)="y" THENGOTO 3
Ø
44Ø CLEAR 2ØØ,&H7FFF:PRINT"Loadi
ng Main System... Please wait...
":CLOSE:UNLOAD:RUN"COBBS.STM"
45Ø A$=" ":POKEVARPTR(A$),&H8Ø:P
OKEVARPTR(A$)+2,&H7E:POKEVARPTR(
A$)+3,Ø
46Ø BL=BL+1:RC$(BL)=A$:POKE 1Ø24
,BL AND 255
461 LOCATE1Ø,1Ø:PRINT"Blocks Rec
eived ";BL;:'USE THIS FOR COCO I
II
462 REM PRINT @33,"BLOCKS RECEIV
ED ";BL;:'USE THIS FOR COCO II
47Ø IF BL<1ØØ THEN RETURN
48Ø FOR X=1 TO 1ØØ:PRINT#1,RC$(X
);:NEXT X:BL=Ø:RETURN
49Ø '
```

```
5ØØ T=Ø
51Ø E=PEEK(&HFF69):F=E AND 16
52Ø IF F THEN POKE&HFF68,6:GOTO
38Ø
53Ø T=T+1:IF T<1ØØØ THEN 51Ø ELS
E PRINT"PAK NOT READY!":GOSUB57Ø
:GOTO44Ø
54Ø POKE&HFF6A,PEEK(&HFF6A) AND
&H9F
55Ø POKE&HFF6B,PEEK(&HFF6B) AND
&H9F
56Ø RETURN
57Ø POKE&HFF6A,PEEK(&HFF6A) OR &
H6Ø
58Ø POKE&HFF6B,PEEK(&HFF6B) OR &
H2Ø
59Ø RETURN
6ØØ EC=EC+1:IF EC=5 THEN44ØELSE1
8Ø
7ØØ IFPEEK(4658)=ØTHEN71ØELSE CD
=PEEK(65385):CD=CD AND 32:IF CD<
>Ø OR PEEK(4657)<>Ø THEN44ØELSE7
1Ø
71Ø RETURN
875 POKE&HØ168,PEEK(4681):POKE&H
Ø169,PEEK(4682):RETURN
885 POKE&HØ168,&H1Ø:POKE&HØ169,&
HE6:RETURN
```

Listing 4: XMRECPK.BAS

```
Ø 'XMRECPK.BAS V2.1
1 'COPYRIGHT 1986 BY JOHN GRUBB
2 'THIS ROUTINE POKES THE
3 'MACHINE CODE FOR THE
4 'XMRECV/BIN ROUTINE
1Ø DATA  134, Ø, 95, 111, 14Ø, 2
46, 48, 141, 255, 114, 167, 128,
 92, 193, 128, 38, 249, 134, 21,
 23, Ø, 1Ø7, 134, Ø, 167, 2865
2Ø DATA  141, Ø, 168, 2Ø6, Ø, Ø,
 23, Ø, 124, 129, 1, 39, 25, 183
, 127, 254, 129, 24, 39, 83, 129
, 4, 39, 79, 1Ø8, 2Ø54
3Ø DATA  141, Ø, 143, 166, 141,
Ø, 139, 129, 255, 38, 223, 32, 2
1Ø, 23, Ø, 74, 167, 14Ø, 184, 23
, Ø, 68, 167, 14Ø, 179, 2782
4Ø DATA  48, 141, 255, 45, 23, Ø
, 58, 167, 128, 1Ø8, 14Ø, 165, 1
66, 14Ø, 162, 129, 128, 38, 241,
 23, Ø, 43, 167, 14Ø, 155, 281Ø
5Ø DATA  48, 141, 255, 2Ø, 95, 1
66, 128, 92, 193, 128, 39, 4, 17
1, 128, 32, 247, 161, 14Ø, 136,
39, 7, 134, 21, 183, 126, 2834
6Ø DATA  15Ø, 32, 128, 57, 246,
255, 1Ø5, 196, 16, 39, 249, 183,
 255, 1Ø4, 57, 182, 255, 1Ø5, 13
2, 32, 38, 4Ø, 182, 255, 1Ø5, 33
98
7Ø DATA  132, 8, 39, 242, 182, 2
55, 1Ø4, 57, 182, 255, 1Ø5, 132,
 8, 39, 4, 182, 255, 1Ø4, 57, 18
2, 255, 1Ø5, 132, 32, 38, 3Ø86
8Ø DATA  11, 134, Ø, 51, 65, 17,
 131, Ø, 255, 38, 228, 57, 134,
24, 183, 127, 254, 32, 19Ø, 5Ø,
126, Ø, 21Ø7
14Ø CLS:PRINT@2ØØ,"NOW POKING CO
DE"
15Ø CLEAR2Ø,&H7BFE:ST=&H7E84:C=Ø
16Ø FOR Y=1 TO 7
17Ø FOR X=1 TO 25
18Ø GOSUB 4ØØ
19Ø NEXT X
2ØØ GOSUB 5ØØ
21Ø NEXT Y
22Ø Y=8:FOR X=1 TO 22
23Ø GOSUB 4ØØ
24Ø NEXT X
25Ø GOSUB 5ØØ
26Ø CLS
27Ø PRINT"INSERT DISK TO RECEIVE
 FILE IN"
28Ø INPUT"DRIVE Ø AND PRESS ENTE
R";A$
29Ø SAVEM"XMRECV/BIN",&H7E84,&H7
F48,&H7EØØ
3ØØ PRINT"FILE HAS NOW BEEN SAVE
D"
31Ø END
32Ø STOP
4ØØ READ N:POKE ST,N
41Ø C=C+N:ST=ST+1
42Ø PRINT @Ø,N
43Ø RETURN
5ØØ READ N
51Ø IF N<>C THEN PRINT "ERROR IN
 LINE #";(Y*1Ø):STOP
52Ø C=Ø:RETURN
```

```
30 .....128   1250 .....250   1530 .....166
112 .....165  1320 .....102   9210 .....123
610 .....236  1380 .....108   9620 .....148
1005 .....233 1460 .....67    END .....131
1217 .....119
```

Listing 5: XMSEND.SYS

```
Ø 'XMSEND.SYS V2.1
1 'COPYRIGHT 1986 BY JOHN GRUBB
2 'PROGRAM TO ALLOW XMODEM DOWNL
OADS
3 'FROM THE COBBS BBS SYSTEM.
4 'MUST USE XMSEND/BIN WITH THIS
 PROGRAM.
5 ON ERR GOTO 3Ø
1Ø CLEAR15ØØØ,&H7DFF
11 DIM BC$(21),L$(8Ø),TY$(21),TX
$(21),D$(21),B$(1ØØ),KY$(21):NU$
=CHR$(Ø):DR$(Ø)="Ø":DR$(1)="1":D
```

```
R$(2)="2":DR$(3)="3"
12 DEFUSRØ=&HØEDØ:DEFUSR1=&HØED3
:DEFUSR2=&HØE81:DEFUSR3=&H7EØØ:O
N ERR GOTO3Ø:GOSUB95ØØ:GOSUB25:G
OTO9ØØ
25 '
26 IFPEEK(4658)=ØTHEN28 ELSE CD=
PEEK(65385):CD=CD AND 32:IF CD <
>Ø OR PEEK(4657)<>Ø THEN 27 ELSE
 28
27 CLOSE:POKE65387,54:POKE65386,
1Ø7:FORT=1TO1ØØ:NEXTT:TR$=TR$+"L
OC":GOSUB9615:CLEAR2ØØ,&H7FFF:LO
AD"USER.STM",R
28 II$=INKEY$:IFII$=""THEN29ELSE
CH$=II$:K=INSTR("^_ ]",II$):IFK=
ØTHEN29ELSE ON K GOSUB 8ØØ,31,71
3Ø,98ØØ
29 RETURN
3Ø PRINT:PRINT"Unable to ACCESS.
 Returning to Main System..":GOT
O1ØØØØ
31 RETURN
1ØØ '
1Ø1 DC=VAL(HEX$(PEEK(&HØEFD))):H
R=VAL(HEX$(PEEK(&HØEFE))):MN=VAL
(HEX$(PEEK(&HØEFF))):SS=VAL(HEX$
(PEEK(&HØFØØ))):HR$=RIGHT$(STR$(
HR),2):IFHR<1ØTHEN MID$(HR$,1,1)
="Ø"
1Ø4 MN$=RIGHT$(STR$(MN),2):IFMN<
1ØTHEN MID$(MN$,1,1)="Ø"
1Ø5 TI$=HR$+":"+MN$:IF SS<54ORMN
>58THEN1Ø8
1Ø6 MN=MN+1:IFMN>59 THENMN=Ø:HR=
HR+1:IF HR>23 THENHR=Ø
1Ø7 X=USR1(HR*256+MN)
1Ø8 X=PEEK(4611):IFX<>DC THEN111
1Ø9 DA$=RIGHT$(STR$(PEEK(46Ø8)),
2)+"/"+RIGHT$(STR$(PEEK(46Ø9)),2
)+"/"+RIGHT$(STR$(PEEK(461Ø)),2)
11Ø GOTO118
111 MM=PEEK(46Ø8):DA=PEEK(46Ø9):
YY=PEEK(461Ø):DA=DA+1:IFDA>31THE
NDA=1:MM=MM+1:IF MM>12 THEN MM=1
:YY=YY+1
112 POKE46Ø8,MM:POKE46Ø9,DA:POKE
461Ø,YY:POKE4611,DC:GOTO1Ø9
118 AX=PEEK(4615)*6Ø+PEEK(4616):
PT=HR*6Ø+MN:IFF3=1THEN124ELSEUO=
PEEK(4619):IFPT-AX<(UO*5)-5 OR U
O=255 THEN121
119 TØ=PEEK(4619)*5:T1=TØ-(PT-AX
):IFT1<1THEN T1=Ø:GOTO12Ø ELSE P
RINT"You only have";T1;"Minutes
left!":GOTO121
12Ø PRINT"No time left!":TR$=TR$
+"TIMED OUT "+TI$:GOSUB9615:GOTO
982Ø
121 '
124 RETURN
15Ø '
152 F=ASC(F$):E=128:F$=""
154 FOR Q=1 TO 8
156 J=INT(F/E)
158 IF J=Ø THEN F$=F$+"Ø"ELSEF$=
F$+"1"
16Ø F=F-(E*J):E=E/2
162 NEXT Q
166 RETURN
6ØØ '
6Ø3 TIMER=Ø
6Ø4 GOSUB25:ON ERR GOTO 117Ø
6Ø5 EXEC&H1ØDA:CH$=CHR$(PEEK(448
1)):IC$=INKEY$:IFIC$<>""THEN CH$
=IC$:GOTO615
6Ø9 IF TIMER>4ØØØTHEN PRINT:PRIN
T:PRINT"You timed out!!":TR$=TR$
+"KTO":GOSUB9615:GOTO982Ø
61Ø IFCH$=CHR$(Ø)THEN6Ø4
615 RETURN
655 GOSUB25:ON ERR GOTO 117Ø:LIN
EINPUTCH$:GOSUB25:RETURN
675 GOSUB655:G1$="":IFCH$=""THEN
RETURN
68Ø FOR G=1 TO LEN(CH$)
685 G1=ASC(MID$(CH$,G,1)):IFG1>9
6ANDG1<123THEN G1=G1-32
69Ø G1$=G1$+CHR$(G1):NEXTG:CH$=G
1$:RETURN
8ØØ RETURN
85Ø '
855 POKE&HØ16B,197:POKE&HØ16C,PE
EK(4684):RETURN
875 POKE&HØ168,PEEK(4681):POKE&H
Ø169,PEEK(4682):RETURN
885 POKE&HØ168,&H1Ø:POKE&HØ169,&
HE6:RETURN
9ØØ B=PEEK(&H7EØØ):TD=PEEK(&H7EØ
1):ZK=PEEK(&H7EØ2):ZD=PEEK(&H7EØ
3)
9Ø5 D$="":A$="":FORX=&HØ TO &H3:
D=PEEK(&H7EØ4+X):A$=CHR$(D):D$=D
$+A$:NEXT X
1ØØØ '
1ØØ5 GOSUB25:ON ERR GOTO 1175
1Ø1Ø '
1Ø15 '
1Ø2Ø GOTO12ØØ
117Ø '
1175 PRINT"System Error!, Wait..
.";:PRINTCHR$(7);
118Ø ER=PEEK(&HFD):EL=PEEK(&HFE)
*&H1ØØ+PEEK(&HFF)
1181 IF ER=>54 THEN EA=&HC242+ER
:GOTO1185
1182 IF ER=>5Ø THEN EA=&H88D9+ER
:GOTO1185
```

```
1183 EA=&HABAF+ER
1185 ER$=CHR$(13)+"***ERROR TYPE
 "+CHR$(PEEK(EA))+CHR$(PEEK(EA+1
))+" IN LINE"+STR$(EL)+"***":PRI
NTER$:GOTO12ØØ
12ØØ ON ERR GOTO 1229:GOSUB885:P
RINTCHR$(7):IFTD>2THENPRINT:PRIN
T"File to D/L: ";:GOTO1215
12Ø6 IF D9=Ø THEN D9=1:CH$="M":G
OTO1225
121Ø PRINT:GOSUB1ØØ:PRINT"[M]enu
,<CR> to Exit or":PRINT"# to Dow
nload: ";:FT$="":F$=""
1215 GOSUB675:ONERR GOTO1229:IFC
H$=""THEN D9=Ø:GOTO1ØØØELSEFT$=
CH$:IFTD<3THENIFLEN(CH$)>4THEN12
ØØELSE122Ø
1216 IFLEFT$(CH$,3)<>"DIR"THENF$
=CH$:GOTO1226ELSE D=VAL(RIGHT$(C
H$,1)):IF TD<4 THEN D=ZD
1217 IFD=1THEN DIR1:GOTO1219ELSE
IFD=2THENDIR2:GOTO1219
1218 IF D=ØTHEN DIRØ ELSE DIR3
1219 PRINT"Free: ";FREE(D):GOTO1
2ØØ
122Ø GOSUB25:IFCH$<>"M"THEN123Ø
1225 FT$="DOWN"+D$+"/MNU:":D=-1:
GOSUB1245:GOTO121Ø
1226 IFTD=3THEN D=ZD ELSEPRINT"D
RIVE: ";:GOSUB6ØØ:ON ERR GOTO12Ø
Ø:D=VAL(CH$):IFD>3THEN1226ELSEPR
INTD
1227 IFZK>Ø THEN X$=RIGHT$(F$,4)
:IFX$="/SYS"ORX$="/BIN"THEN12ØØ
1228 F$=F$+":"+DR$(D):ONERR GOTO
129Ø:GOTO123Ø
1229 GOTO1175
123Ø CLS:PRINT"1 - ASCII, No Buf
fer":PRINT"2 - ASCII, With Buffe
r":PRINT"3 - Xmodem D/L":PRINT"P
ress <CR> to exit"
1235 GOSUB6ØØ:ONERR GOTO12ØØ:X=V
AL(CH$):B=X-1:IFX=ØTHENRETURNELS
EIFX>ØORX<4THENPRINTTAB(3)CH$ELS
E1235
1237 IFTD>3THEN1255
124Ø FT$=D$+FT$+"/DOW:":D=-1
1245 ON ERR GOTO1245
125Ø IFTD=3THEN129ØELSED=D+1:IFD
>3THEN129ØELSE F$=FT$+DR$(D)
1255 CLOSE:UNLOAD:ONERR GOTO125Ø
:OPEN"I",#1,F$:ONERR GOTO129Ø:PR
INTCHR$(12):CLS:IFCH$="M"THEN127
Ø
1257 IFX=3THEN 13ØØ
126Ø IF B=Ø THENPRINT"Open Buffe
r.....":PRINTCHR$(7):FOR O =1 TO
 15ØØ:NEXTO
1265 IF B=1 THENPRINTCHR$(18);
127Ø IFEOF(1)THEN1275ELSEGOSUB25
:LINEINPUT#1,A$:PRINTA$:EXEC4314
:CH=PEEK(4481):IFCH=83ORCH=115OR
INKEY$="S"THEN1275ELSE127Ø
1275 ONERRGOTO12ØØ:IFCH$="M" THE
N 128ØELSEIF B=1 THENPRINTCHR$(2
Ø)ELSEFORO=1TO15ØØ:NEXTO
128Ø CLOSE:TR$=TR$+CHR$(13)+"DOW
: "+F$+CHR$(13):GOSUB961Ø:GOTO12
ØØ
129Ø ON ERR GOTO12ØØ:PRINTCHR$(7
);:PRINT"Unable to access.":PRIN
T:GOTO12ØØ
13ØØ LOADM"XMSEND/BIN":ON ERR GO
TO 1625
131Ø CLS:PRINTCHR$(12):PRINT"CoB
BS Xmodem Downloader V2.1":PRINT
"By John Grubb":PRINT"Copyright
1986"
1315 PRINT:PRINT"1. Continue wit
h Download"
132Ø PRINT"2. Return to CoBBS"
1325 PRINT"Comand>>";
133Ø GOSUB6ØØ
1335 IF CH$<"1"ORCH$>"2"THEN133Ø
ELSEPRINTCH$
134Ø IF CH$="2" THEN CLOSE:UNLOA
D:GOTO1ØØØØ
1345 ON ERR GOTO 12ØØ
135Ø CLOSE:OPEN"D",#1,F$,128:FIE
LD#1,128 AS R$:PF=Ø:RD=Ø:BL=Ø:BC
=Ø
1355 PRINT"Loading program for b
lock count.."
136Ø GOSUB154Ø:PRINT TB;"Blocks
to send."
1365 PRINT:PRINT"Continue with d
ownload? (Y/N)";
137Ø ON ERR GOTO 1175: GOSUB6ØØ:
IFCH$=""THEN137ØELSEIFCH$="Y"OR
CH$="y"THEN PRINT"YES!":GOTO1375
 ELSE PRINT"NO":CLOSE:GOTO12ØØ
1375 ONERRGOTO1625:PRINTCHR$(12)
:PRINT"Ready to transmit.":PRINT
"On MIKEY TERM press":PRINT" <DO
WNARROW><4>.":PRINT"Begin XMODEM
 TRANSMISSION":GOSUB25:GOSUB16Ø5
:GOSUB1415:IF RD THEN GOSUB144Ø:
PRINT"<NAK> not recived!":GOTO13
1Ø ELSE1385
138Ø GOSUB154Ø
1385 GOSUB875:CLS2:FOR BV=1TOBL
1386 LOCATE1Ø,1Ø:PRINT"Blocks le
ft to send";(TB-BC);:'FOR COCO I
II USE THIS
1387 REM PRINT@33,"BLOCKS LEFT T
O SEND";(TB-BC);:'FOR COCO II US
E THIS
1388 GOSUB 1445
139Ø POKE 1Ø24,BC:LPOKE&H6ØØØØ,B
C:NEXTBV:'FOR COCO II, DELETE TH
E LPOKE STATEMENT.
1395 BL=Ø:IFLB=Ø THEN138Ø
14ØØ GOSUB1485
14Ø5 GOSUB144Ø
```

```
141Ø CLOSE:UNLOAD:GOSUB885:FORX=
1TO5:PRINTCHR$(7);:NEXT X:GOTO12
ØØ
1415 GOSUB25:X=Ø:RD=Ø
142Ø E=PEEK(65385):F=E AND 8
1425 IF F=Ø THEN 1435
143Ø IF PEEK(65384)<>21 THEN1435
 ELSERETURN
1435 X=X+1:IF X<1ØØØ THEN 142Ø
144Ø POKE&HFF6B,PEEK(&HFF6B)OR&H
2Ø:POKE&HFF6A,PEEK(&HFF6A) OR &H
6Ø:RD=1:RETURN
1445 GOSUB25:BC=BC+1:POKE&H7F1B,
BC
145Ø A=USR3(VARPTR(B$(BV)))
1455 IF A=1 THEN TR$=TR$+"XMODEM
 STRING ERROR":GOSUB9615:GOSUB16
2Ø:GOTO141Ø
146Ø IF A=2 THEN TR$=TR$+"COMMUN
ICATIONS FAILURE! - MODEM OR RS2
32 PAK":GOSUB9615:GOSUB162Ø:GOTO
141Ø
1465 IF A=3 THEN TR$=TR$+"XMODEM
 TIME OUT.":GOSUB9615:GOSUB162Ø:
GOTO141Ø
147Ø IF A=4 THEN TR$=TR$+"DOWNLO
AD - 6 RETRIES ATTEMPTED":GOSUB9
615:GOSUB162Ø:GOTO141Ø
1475 IF A<>Ø THEN TR$=TR$+"FATAL
 ERROR":GOSUB9615:GOSUB162Ø:GOTO
12ØØ
148Ø RETURN
1485 D=4:GOSUB1495:T=Ø
149Ø GOSUB1525:T=T+1:IF D=6 THEN
GOTO144ØELSEIFT<2ØØ THEN 149ØELS
E144Ø
1495 T=Ø
15ØØ E=PEEK(65385)
15Ø5 E=E AND 16
151Ø IF E THEN POKE 65384,D:RETU
RN ELSET=T+1
1515 IF T<1ØØØ THEN 15ØØ
152Ø GOTO 144Ø
1525 E=PEEK(65385):F=E AND 8
153Ø IF F THEN D=PEEK(65384): EL
SE D=Ø
1535 RETURN
154Ø TB=LOF(1)+1:LB=Ø
1545 PF=PF+1
155Ø IF PF>LOF(1) THEN 1575
1555 BL=BL+1:GET#1,PF
156Ø B$(BL)=R$
1565 IF BL=1ØØ THEN RETURN
157Ø GOTO1545
1575 MF=(PF-1)*128:LB=1
158Ø CLOSE:OPEN"D",#1,F$,1:FIELD
#1,1 AS R$
1585 BL=BL+1:B$(BL)=""
159Ø MF=MF+1:IF MF<=LOF(1) THEN
GET#1,MF:B$(BL)=B$(BL)+R$:GOTO15
9Ø
1595 IF LEN(B$(BL))<128 THENB$(B
L)=B$(BL)+" ":GOTO1595
16ØØ CLOSE:RETURN
16Ø5 POKE&HFF6B,PEEK(&HFF6B) AND
 &H9F:POKE&HFF6A,PEEK(&HFF6A) AN
D &H9F
161Ø RETURN
162Ø GOSUB144Ø:PRINT"XMODEM ERRO
R":RETURN
1625 GOSUB144Ø:GOTO12ØØ
713Ø RETURN
92ØØ '
92Ø5 F$="USERL.SYS:"+DR$(PEEK(46
72))
921Ø OPEN"D",#1,F$,96
9215 FIELD#1,5Ø AS UN$,8 AS UP$,
1 AS UR$,1 AS UA$,1 AS U1$,1 AS
U2$,1 AS UU$,1 AS UE$,5 AS U5$,5
 AS UM$,5 AS UD$,1 AS U3$,1 AS U
4$,1 AS UO$,1 AS UL$,4 AS US$,9
AS SP$
922Ø K1=LOF(1):RETURN
95ØØ '
951Ø GOSUB92ØØ:GET#1,1
952Ø K=INSTR(UN$,CHR$(Ø)):NA$=LE
FT$(UN$,K-1):PR=ASC(UA$):F$=U1$:
GOSUB15Ø:P1$=F$:F$=U2$:GOSUB15Ø:
P2$=F$:UL=ASC(UL$):IF UL<1 OR UL
>4 THENUL=1
955Ø BC=ASC(UE$):LM=CVN(UM$):POK
E4619,ASC(UO$):POKE4628,UL:POKE4
618,BC:POKE462Ø,PR:POKE4621,ASC(
U1$):POKE4622,ASC(U2$):CLOSE:RET
URN
961Ø IFLEN(TR$)<64THENRETURN
9615 FR=PEEK(4669):ONERR GOTO 96
7Ø:IFFR=ØTHEN9635ELSEIFFR=1THEN9
64ØELSEIFFR=3THEN966ØELSECLOSE:F
$="TRACER.SYS:"+DR$(PEEK(4675)):
OPEN"D",#1,F$,128
9616 FR=FREE(PEEK(4675)):IFFR<3T
HENCLOSE:RETURN
962Ø FIELD#1,128 AS X$:K1=LOF(1)
:K1=K1+1:LSET X$=TR$+CHR$(Ø):PUT
#1,K1
9635 CLOSE:TR$="":RETURN
964Ø OPEN"O",-1,"TRACER/SYS":PRI
NT#-1,TR$:GOTO9635
966Ø PT=PEEK(&HFF22)AND1:IFPT=1T
HEN9635ELSEPRINT#-2,TR$:GOTO9635
967Ø POKE4669,Ø:GOTO1ØØØ
982Ø CLS:PRINT:PRINT"Thanks for
calling":PRINT"The Gallipolis Co
BBS..."
9825 PRINT:CLEAR2ØØ,&H7FFF
983Ø POKE4615,HR:POKE4616,MN:POK
E4617,SS
984Ø PRINT"Please hang up now.":
POKE65386,1Ø6:LOAD"USER.STM",R
1ØØØØ CLEAR2ØØ,&H7FFF:PRINTCHR$(
12):PRINT:PRINT:PRINT:PRINT"Load
ing Main System... Please Wait":
LOAD"COBBS.STM",R
```

Listing 6: XMSNDPK.BAS

```
Ø 'XMSNDPK.BAS V2.1
1 'COPYRIGHT 1986 BY JOHN GRUBB
2 'THIS ROUTINE POKES THE
3 'MACHINE CODE FOR THE
4 'XMSEND/BIN ROUTINE.
1Ø DATA  16, 239, 141, 1, 27, 18
9, 179, 237, 31, 2, 23Ø, 164, 17
4, 34, 193, 128, 16, 38, Ø, 235,
 95, 111, 141, 1, 3, 2625
2Ø DATA  134, 1, 141, 92, 166, 1
41, Ø, 25Ø, 141, 86, 136, 255, 1
41, 82, 95, 2Ø6, Ø, Ø, 239, 141,
 Ø, 234, 166, 128, 141, 3116
3Ø DATA  7Ø, 52, 4, 52, 2, 79, 5
2, 2, 236, 141, Ø, 219, 227, 225
, 237, 141, Ø, 213, 53, 4, 92, 1
93, 128, 39, 2, 2463
4Ø DATA  32, 226, 166, 141, Ø, 2
Ø1, 141, 38, 141, 1Ø5, 129, 6, 3
8, 9, 111, 141, Ø, 191, 79, 95,
22, Ø, 16Ø, 48, 136, 2356
5Ø DATA  128, 1Ø8, 141, Ø, 179,
52, 2, 166, 141, Ø, 173, 129, 6,
 16, 44, Ø, 159, 53, 2, 32, 16Ø,
 52, 2, 52, 64, 1861
6Ø DATA  2Ø6, Ø, Ø, 239, 141, Ø,
 154, 111, 141, Ø, 149, 53, 64,
182, 255, 1Ø5, 132, 16, 39, 6, 5
3, 2, 183, 255, 1Ø4, 259Ø
7Ø DATA  57, 52, 16, 174, 141, Ø
, 129, 48, 1, 175, 141, Ø, 123,
39, 4, 53, 16, 32, 225, 52, 4, 2
3Ø, 141, Ø, 11Ø, 1963
8Ø DATA  92, 193, 3, 39, 86, 231
, 141, Ø, 1Ø1, 53, 4, 53, 16, 32
, 2Ø4, 52, 64, 2Ø6, Ø, Ø, 239, 1
41, Ø, 87, 111, 2148
9Ø DATA  141, Ø, 82, 95, 84, 182
, 255, 1Ø5, 132, 8, 39, 4, 182,
255, 1Ø4, 57, 52, 16, 174, 141,
Ø, 64, 48, 1, 175, 2334
1ØØ DATA  141, Ø, 58, 39, 4, 53,
 16, 32, 227, 52, 4, 23Ø, 141, Ø
, 45, 92, 193, 21, 44, 26, 231,
141, Ø, 36, 53, 1879
11Ø DATA  4, 53, 16, 32, 2Ø6, 79
, 198, 1, 16, 238, 141, Ø, 25, 1
26, 18Ø, 244, 2Ø4, Ø, 2, 32, 243
, 2Ø4, Ø, 3, 32, 2279
12Ø DATA  238, 2Ø4, Ø, 4, 32, 23
3, Ø, Ø, Ø, Ø, Ø, Ø, Ø, Ø, Ø, 711
13Ø CLS:PRINT @2ØØ,"NOW POKING C
ODE"
14Ø CLEAR2Ø,&H7DFF:ST=&H7EØØ:C=Ø
15Ø FOR Y=1 TO 11
16Ø FOR X=1 TO 25
17Ø GOSUB 4ØØ
18Ø NEXT X
19Ø GOSUB 5ØØ
2ØØ NEXT Y
21Ø Y=12:FOR X=1 TO 14
22Ø GOSUB 4ØØ
23Ø NEXT X
24Ø GOSUB 5ØØ
25Ø CLS
26Ø PRINT"INSERT DISK TO RECEIVE
 FILE IN"
27Ø INPUT"DRIVE Ø AND PRESS ENTE
R";A$
28Ø SAVEM "XMSEND/BIN",&H7EØØ,&H
7F2Ø,&H7EØØ
29Ø PRINT"FILE HAS NOW BEEN SAVE
D"
3ØØ END
31Ø STOP
4ØØ READ N:POKE ST,N
41Ø C=C+N:ST=ST+1
42Ø PRINT @Ø,N
43Ø RETURN
5ØØ READ N
51Ø IF N<>C THEN PRINT "ERROR IN
 LINE #";(Y*1Ø):STOP
52Ø C=Ø:RETURN
```

Listing 7: FCONV.BAS

```
1Ø CLEAR 1ØØØ
2Ø CLS:PRINT"CHANGE DISK FILETYP
E"
3Ø PRINT"INSTRUCTIONS? (Y/N) ";:
LINEINPUT Z$:IF Z$="Y" THEN GOSU
B 46Ø
4Ø LINEINPUT"FILENAME :";F1$
5Ø LINEINPUT"     EXT :";F2$
6Ø LINEINPUT"     DRV :";DRV$:X=
VAL(DRV$)
7Ø IF F1$="" AND F2$="" AND DRV$
="" THEN 45Ø
8Ø IF F1$="" THEN DIR X:GOTO4Ø
9Ø FORZ=3 TO 11
1ØØ DSKI$X,17,Z,A$,B$
11Ø A$=A$+LEFT$(B$,127)
12Ø FORK=Ø TO 7
13Ø PT=K*32
14Ø NA$=MID$(A$,PT+1,13)
15Ø IF LEFT$(NA$,1)=CHR$(Ø) THEN
```

```
 2ØØ
16Ø IF LEFT$(NA$,1)=CHR$(&HFF) T
HEN PRINT"FILE NOT FOUND!":GOTO4
Ø
17Ø EXT$=MID$(NA$,9,3)
18Ø X$=RIGHT$(NA$,2):B1=ASC(LEFT
$(X$,1)):B2=ASC(RIGHT$(X$,1))
19Ø IF F1$=LEFT$(NA$,LEN(F1$)) A
ND F2$=EXT$ THEN GOTO22Ø
2ØØ NEXTK
21Ø NEXTZ
22Ø CLS:PRINTCHR$(12):PRINT:PRIN
TLEFT$(NA$,11)
23Ø PRINT"THIS IS A ";
24Ø IF B1=1 AND B2=255 THEN PRIN
T"ASCII DATA FILE"
25Ø IF B1=Ø AND B2=Ø THEN PRINT"
BINARY BASIC FILE"
26Ø IF B1=Ø AND B2=255 THEN PRIN
T"ASCII BASIC FILE"
27Ø IF B1=2 AND B2=Ø THEN PRINT"
MACHINE LANG. FILE"
28Ø PRINT:PRINT"CONVERT THIS TO.
.."
29Ø PRINT"1. ASCII DATA"
3ØØ PRINT"2. BINARY BASIC"
31Ø PRINT"3. ASCII BASIC"
32Ø PRINT"4. MACHINE LANG."
33Ø PRINT:LINEINPUT">";Z$
34Ø IF Z$<"1" OR Z$>"4" THEN 28Ø
35Ø IF Z$="1" THEN X$=CHR$(1)+CH
R$(&HFF)
36Ø IF Z$="2" THEN X$=CHR$(Ø)+CH
R$(Ø)
37Ø IF Z$="3" THEN X$=CHR$(Ø)+CH
R$(&HFF)
38Ø IF Z$="4" THEN X$=CHR$(2)+CH
R$(Ø)
39Ø LINEINPUT"SURE? (Y/N)";Z$:IF
 Z$<>"Y" THEN 45Ø
4ØØ N1$=LEFT$(NA$,11)+X$
41Ø MID$(A$,PT+1,13)=N1$
42Ø C$=LEFT$(A$,128):D$=RIGHT$(A
$,127)+CHR$(Ø)
43Ø DSKO$X,17,Z,C$,D$
44Ø GOTO 4Ø
45Ø PRINT"1. EXIT TO DOS":PRINT"
2. RESTART":LINEINPUT">";Z$:IF Z
$="1" THEN END ELSE GOTO1Ø
46Ø PRINT:PRINT"THIS PROGRAM WIL
L ALLOW YOU TO"
47Ø PRINT"CHANGE THE DIRECTORY T
YPE OF"
48Ø PRINT"XMODEM FILES THAT HAVE
 BEEN UP-"
49Ø PRINT"LOADED TO COBBS! WHEN
THIS PRO-"
5ØØ PRINT"GRAM ASKS FOR THE FILE
NAME GIVE"
51Ø PRINT"ONLY THE FILENAME! YOU
 WILL BE"
52Ø PRINT"PROMPTED FOR THE EXTEN
SION AND"
53Ø PRINT"DRIVE #. TO EXIT THIS
PROGRAM"
54Ø PRINT"JUST PRESS <ENTER> AT
THE FILE-"
55Ø PRINT"NAME, EXT, AND DRV PRO
MPTS"
56Ø PRINT:PRINT
57Ø LINEINPUT"PRESS <ENTER>...";
ZZ$
58Ø CLS
59Ø PRINT"TO TAKE A DIR ON A DRI
VE, PRESS"
6ØØ PRINT"THE ENTER KEY IN RESPO
NSE TO "
61Ø PRINT"THE FILENAME AND THE E
XT"
62Ø PRINT"PROMPTS. THEN PRESS TH
E # OF"
63Ø PRINT"THE DRIVE ON WHICH YOU
 WISH TO"
64Ø PRINT"SEE A DIRECTORY."
65Ø PRINT:PRINT
66Ø RETURN
```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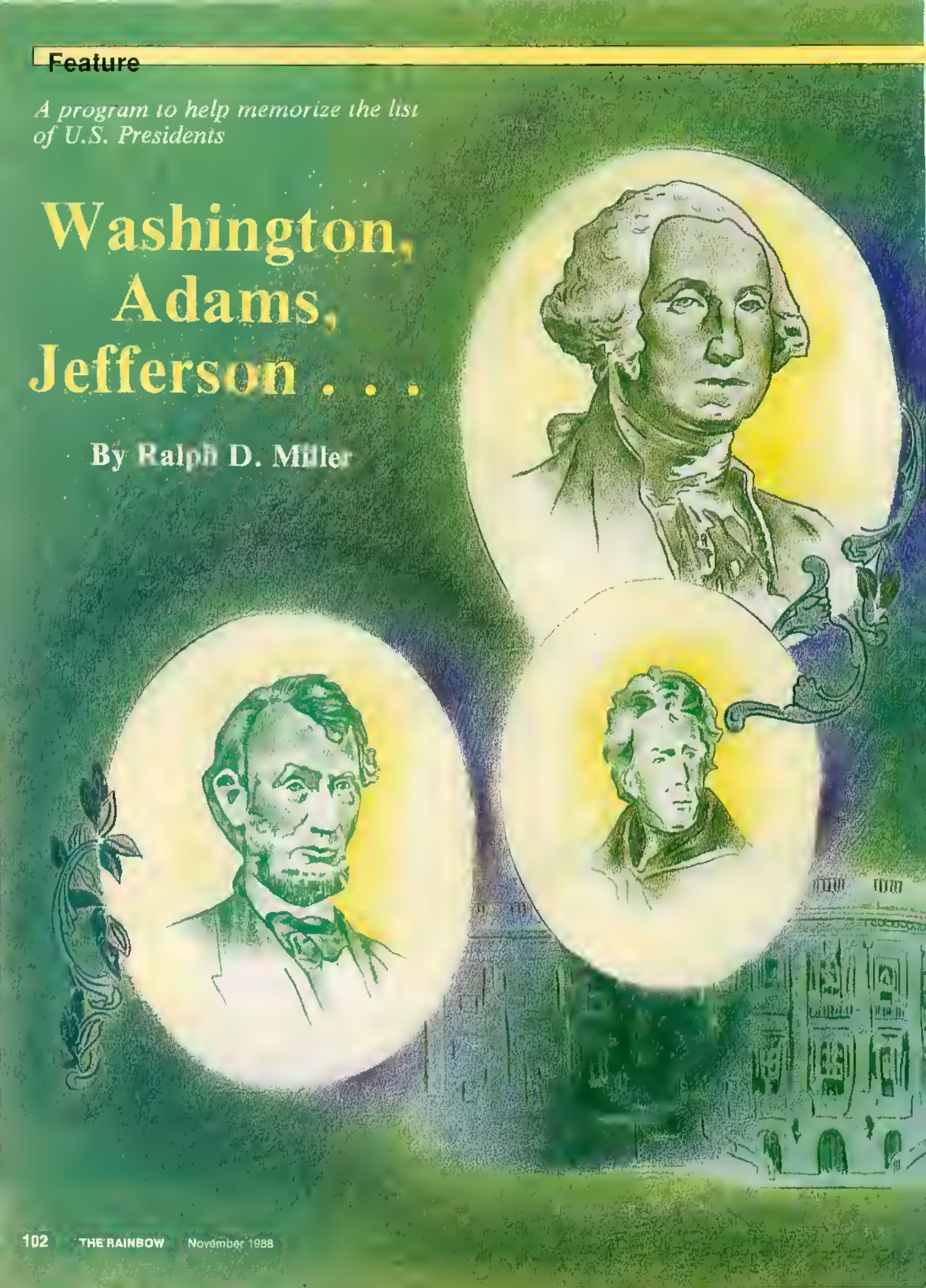
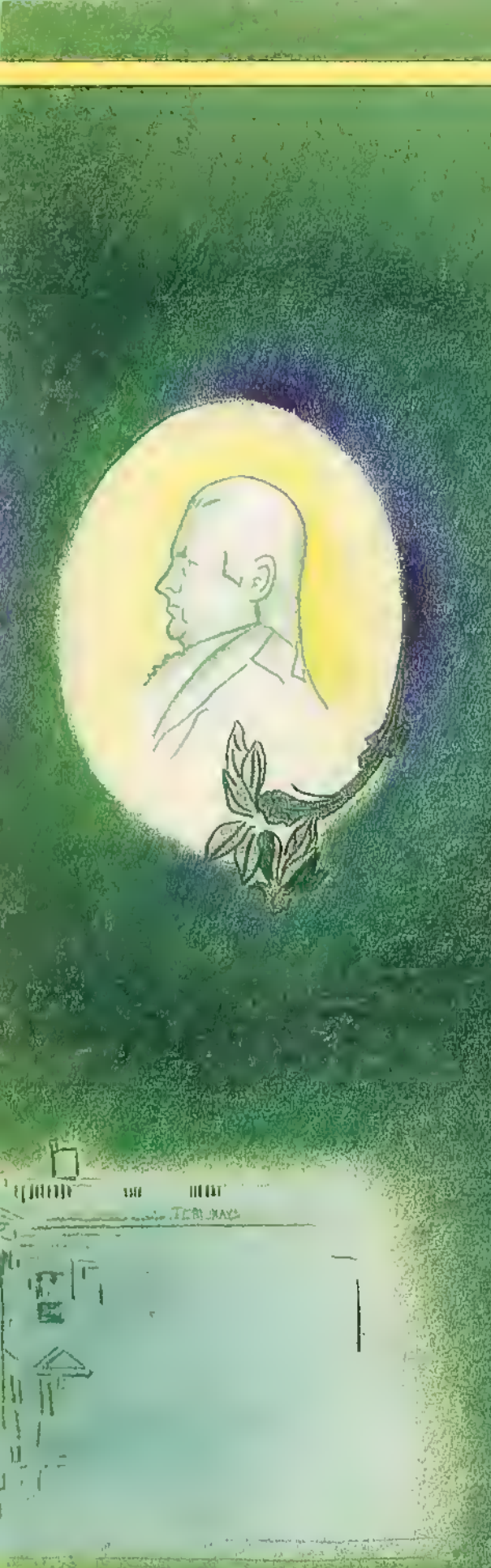
A program to help memorize the list of U.S. Presidents

Washington, Adams, Jefferson . . .

By Ralph D. Miller





When my eldest daughter was assigned the learning of the list of presidents of the United States, I wrote *Presidents* to help her. It has been tested by members of her fifth grade class and found to be effective. The techniques used are quite simple, so it is a good choice for beginning programmers to use in experimenting with modifications.

As written, *Presidents* runs in 16K Extended Disk BASIC. Instructions follow to modify the program for cassette-based systems. It can also be made usable on non-extended machines by deleting lines 710, 720 and 730, and by changing GOTO 710 in Line 172 to GOTO 740.

The printer baud rate is set in Line 740 and as written, is set for 2400 on my IDS-460 printer. For use at 600 baud, change POKE150,17 in Line 740 to POKE150,87. For 1200 baud, use POKE150,41. Some systems prefer POKE150,18 for 2400 baud operation. The only other printer code in the program is in Line 794 (CHR$(12)) for form feed.

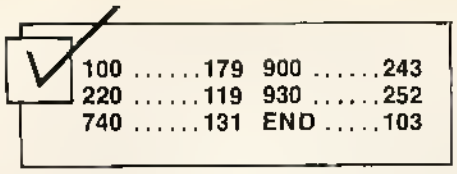
Presidents is designed to run a directory program when you exit. The one that I use is *Hello* by Doug Heyza (August 1985, Page 69). If you don't want to use such a program, change Line 160 to IF Z$="R" THEN CLS:DIR.

To modify the program for cassette use, take RETURN (TO MAIN MENU) out of Line 710, and delete the spaces after END until the 'q' in QUIT is directly under the 'h' in HARD. Next delete Line 160. Finally, in Line 130, delete AND Z$<>"R"

That's about it! *Presidents* is neither long nor complex. Type it in and give the children a bit more perspective on history. I'm sure the comments on progress section (lines 815 through 935) could be much more creative, so add your own, perhaps personalized for your child.

Questions or comments concerning this program may be directed to the author at P.O. Box 13322, Tallahassee, FL 32317. Please enclose an SASE when requesting a reply.) □

Ralph Miller is a broadcast engineer on the systems staff at John H. Phipps Broadcasting. He lives in Tallahassee, Florida.



The Listing: PRESDENT

```
5 CLS
1Ø REM THIS PROGRAM (C) 1985 BY
RALPH D. MILLER, POB 13322, TALL
AHASSEE, FL 32317 (9Ø4) 386-3618
---ALL RIGHTS RESERVED---
22 PRINT
24 PRINT"            presdent"
26 PRINT
28 PRINT" **********************
********"
29 PRINT" ***** MEMORIZATION HEL
PER ****"
3Ø PRINT" ************ FOR *****
********"
31 PRINT" ****** U.S. PRESIDENTS
 *******"
32 PRINT" **********************
********"
33 PRINT" * (C)1985 BY RALPH D.
MILLER *"
34 PRINT" ******* (9Ø4) 386-3618
 *******"
35 PRINT" **********************
********"
36 PRINT" **** ALL RIGHTS  RESER
VED ****"
37 PRINT" **********************
********"
4Ø FOR T=1 TO 5ØØØ:NEXT T
1ØØ DIM A$(4Ø),B$(4Ø),C$(4Ø)
1Ø5 CLS:V=Ø
11Ø PRINT:PRINT:PRINT"     eASY
(LAST NAME ONLY)           hARD
(ENTIRE NAME)              rETUR
N (TO DISK MENU)           qUIT
(RETURN TO BASIC)          pRINT
 (HARDCOPY LIST)"
12Ø Z$=INKEY$:IF Z$="" THEN 12Ø
13Ø IF Z$<>"E" AND Z$<>"H" AND Z
$<>"R" AND Z$<>"Q" AND Z$<>"P" T
HEN 1ØS
14Ø IF Z$="E" THEN E$="LAST"
15Ø IF Z$="H" THEN E$="ENTIRE"
16Ø IF Z$="R" THEN RUN "DIRECTRY
"
17Ø IF Z$="Q" THEN POKE&H71,Ø:EX
EC&HAØ27
172 IF Z$="P" THEN GOTO 71Ø
17S RESTORE
18Ø CLS
19Ø PRINT"BEGINNING WITH THE FIR
ST, INPUT EACH PRESIDENT'S "E$"
NAME,"
2ØØ LINEINPUT"IN CHRONOLOGICAL O
RDER OF THEIR PRESIDENCY: ";F$
21Ø IF F$="" THEN GOTO 1Ø5
22Ø X=1:W=Ø
23Ø GOSUB 63Ø
27Ø X=X+1
28Ø LINEINPUT"NEXT: ";F$
285 IF F$="" THEN GOTO 8ØØ
3ØØ GOTO 23Ø
63Ø READ A$(X),B$(X),C$(X)
635 IF C$(X)="REAGAN" THEN GOTO
9ØØ
637 IF Z$="E" THEN 672
64Ø IF B$(X)="N" THEN B$(X)="":D
$=A$(X)+" "+C$(X):GOTO 69Ø
65Ø IF B$(X)<>"N" THEN D$=A$(X)+
" "+B$(X)+" "+C$(X)
66Ø IF LEN(B$(X))>1 THEN 69Ø
67Ø D$=A$(X)+" "+B$(X)+"."+" "+C
$(X)
672 IF Z$="E" THEN D$=C$(X)
69Ø IF F$<>D$ THEN PRINT "SORRY.
 YOU SHOULD HAVE ENTERED: "D$:W=
W+1:GOTO 695
695 RETURN
71Ø V=PEEK(6S314):IF V=4 OR V=6
THEN 74Ø
72Ø CLS:PRINT@2ØØ,"printer off l
ine":V$=INKEY$:IF V$="" THEN 72Ø
73Ø V=PEEK(6S314):IF V=4 OR V=6
THEN 74Ø
735 GOTO 1Ø5
74Ø POKE149,Ø:POKE15Ø,17
742 CLS:PRINT@2ØØ,"now printing
list"
7SØ RESTORE
755 FOR Y=1 TO 4Ø
76Ø READ A$(Y),B$(Y),C$(Y)
76S IF B$(Y)="N" THEN B$(Y)="":D
$=A$(Y)+" "+C$(Y):GOTO 79Ø
77Ø IF B$(Y)<>"N" THEN D$=A$(Y)+
" "+B$(Y)+" "+C$(Y)
772 IF LEN(B$(Y))>1 THEN 79Ø
774 D$=A$(Y)+" "+B$(Y)+"."+" "+C
$(Y)
79Ø PRINT#-2,D$
792 NEXT Y
794 PRINT#-2,CHR$(12)
79S GOTO 1Ø5
8ØØ PRINT:PRINT"YOU HAVE GOTTEN
```

```
THROUGH"X-1
81Ø PRINT"PRESIDENTS."
82Ø PRINT"YOU GAVE"W"WRONG ANSWE
R(S)."
83Ø PRINT:PRINT:PRINT"        str
ike any key"
84Ø M$=INKEY$:IF M$="" THEN 84Ø
845 GOTO 1Ø5
9ØØ CLS
9Ø5 PRINT:PRINT"YOU HAVE GOTTEN
THROUGH ALL     FORTY PRESIDENTS
.":PRINT
91Ø PRINT"YOU GAVE"W"WRONG ANSWE
R(S).":PRINT
915 IF W=Ø THEN L$="INCREDIBLY S
TUPENDOUS,          MOVE OVER, E
INSTEIN!":GOTO 95Ø
92Ø IF W<6 THEN L$="OUTSTANDING!
                    YOU WILL VER
Y SOON              HAVE THEM AL
L MASTERED.":GOTO 95Ø
925 IF W<11 THEN L$="VERY GOOD!
                     IT'S ALL DO
WNHILL               FROM HERE."
:GOTO 95Ø
93Ø IF W<21 THEN L$="YOU'RE HALF
WAY THERE!":GOTO 95Ø
935 IF W<31 THEN L$="YOU'VE MAST
ER A QUARTER OF      THEM! PRACT
ICE MAKES PERFECT!"
95Ø PRINT L$:PRINT:PRINT:PRINT"
      strike any key"
96Ø M$=INKEY$:IF M$="" THEN 96Ø
97Ø GOTO 1Ø5
1ØØØ DATA GEORGE,N,WASHINGTON,JO
HN,N,ADAMS,THOMAS,N,JEFFERSON,JA
MES,N,MADISON,JAMES,N,MONROE,JOH
N,QUINCY,ADAMS,ANDREW,N,JACKSON,
MARTIN,VAN,BUREN,WILLIAM,HENRY,H
ARRISON,JOHN,N,TYLER
1ØØ1 DATA JAMES,N,POLK,ZACHARY,N
,TAYLOR,MILLARD,N,FILLMORE,FRANK
LIN,N,PIERCE,JAMES,N,BUCHANAN,AB
RAHAM,N,LINCOLN,ANDREW,N,JOHNSON
,ULYSSES,S,GRANT,RUTHERFORD,B,HA
YES,JAMES,N,GARFIELD
1ØØ2 DATA CHESTER,N,ARTHUR,GROVE
R,N,CLEVELAND,BENJAMIN,N,HARRISO
N,GROVER,N,CLEVELAND,WILLIAM,N,M
CKINLEY,THEODORE,N,ROOSEVELT,WIL
LIAM,H,TAFT,WOODROW,N,WILSON,WAR
REN,G,HARDING,CALVIN,N,COOLIDGE
1ØØ3 DATA HERBERT,N,HOOVER,FRANK
LIN,D,ROOSEVELT,HARRY,S,TRUMAN,D
WIGHT,D,EISENHOWER,JOHN,F,KENNED
Y,LYNDON,B,JOHNSON,RICHARD,M,NIX
ON,GERALD,N,FORD,JAMES,E,CARTER,
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The BBSs in North America

For our Telecommunications issue, we at THE RAINBOW have compiled a list of bulletin board systems running in the United States and Canada. Our list was compiled with the help of all SysOps who answered our request for information. We hope this list will make BBS users aware of the BBS systems in their area.

Our list arranges known BBSs by state and includes the BBS phone number, BBS name and the parameters. The systems are up 24 hours a day, seven days a week, unless otherwise noted by a superscript after the BBS name. Use this list to sample various BBSs, and enjoy the chance try a new system.

If you are running a BBS and would like to have it listed in a future issue of the THE RAINBOW, send us a letter, including the information listed here to: The Rainbow BBS List, P.O. Box 385, Prospect, KY 40059.

State/City	BBS Name	Access Number	Parameters (Baud Rate-Parity-Word Bits-Stop Bits)	SysOp
Alabama				
Mobile	The Color Computer Board of Mobile	(205) 341-4610	300-E-7-1	Edward Jones
Arizona				
Glendale	The Exchange[1]	(602) 848-9902	300/1200-E-8-1	Charles Pippin
Phoenix	CoCo BBS-157	(602) 246-2131	300/1200-N-8-1	Curtiss Schuler
California				
Santa Ana	Color Galaxy	(714) 545-5156	300/1200-O-7-1	Tom Guzman
Connecticut				
Groton	CoConut Manor	(203) 449-1792	300/1200/2400-N-8-1	Ken Parsley
Florida				
Miami	Dade CoCo South	(305) 266-1099	300 to 1200-E-7-1	Robert Jones
Miami	The Matrix BBS	(305) 895-2312	300-N-8-1	Criss Malcom
North Miami	Dade CoCo North	(305) 893-2894	300-E-7-1	Alan Potter
St. Petersburg	The CCUG BBS	(813) 867-2284	300/1200-E-7-1	Tim Jay
Iowa				
Boone	The Tomb	(515) 432-7853	300/1200/2400-N-8-1	Steve Kratz
Illinois				
Chicago	The Mindmaster's Domain	(312) 463-8932	300/1200-N-8-1	David Lucas
Indiana				
Evansville	Disk Bank	(812) 422-4821	300/1200-E-7-1	Dave Jenkins
Shelbyville	Duke's Shelbyville Colorama	(317) 392-2769	300/1200-E-7-1	Duke Norris
Kentucky				
Bulan	Hackers BBS[2]	(606) 439-1853	300 to 1200-N-8-1	Kenny Napier
Maine				
Sanford	TreeTops BBS	(207) 490-2870	300/1200/2400-N-8-1	Michael Lescord

State/City	BBS Name	Access Number	Parameters (Baud Rate-Parity-Word Bits-Stop Bits)	SysOp
Michigan				
Bay City	Warped Board	(517) 686-7598	300/1200/2400-N-8-1	Dave Witucki
Bay City	Plastered Board	(517) 892-7885	300/1200/2400-N-8-1	Mark Danak
Manton	The Manton Modem	(616) 824-6026	300-E-7-1	Carl Johnson
Mississippi				
Meridian	The Compute Rama BBS[3]	(601) 693-8092	300-N-7-1	Kevin Sloan
Missouri				
Kansas City	The Frisky CoCo	(816) 436-2904	300/1200/2400-N-8-1	Jerry Oliver
Nebraska				
Wayne	Hardsector BBS[4]	(402) 375-1513	300-E-7-1	Nathan Tompkins
New Hampshire				
Manchester	CoComaster's BBS[5]	(603)644-4867	300-baud	George Proulx
New Jersey				
Hawthorne	DYM 399/ORA 18	(201) 427-8418	300/1200/2400-N-8-1	David Fischer
Mercerville	TAO BBS	(609) 587-2672	300/1200/2400-E-8-1	Bob Watson
New Milford	The Rainbow Connection Info System	(201) 967-1061	300/1200-N-8-1	Steve Rottinger
North Carolina				
Concord	The Data-Link	(704) 788-7867	300/1200-N-8-1	Jim Brock
Fayetteville	CoCo' nuts BBS	(919) 425-8242	300/1200-E-7-1	Tom Taylor
Gastonia	The BBS of Belmont Abbey College	(704) 825-6201	300 to 2400-E-8-2	Ron Millar
Newport	The Dungeon	(919) 726-9737	300/1200/2400-N-8-1	Chuck Katsekes
Ohio				
Bellaire	Harlock's Hideaway	(614) 676-2505	300/1200/2400-N-8-1	Dave Roth
Gallipolis	The Rainbow's End[6]	(614) 446-7430	300/1200-N-8-1	John Grubb
Sharonville	Omega	(513) 671-2049	300/1200/2400-N-8-1	Thomas Altum

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	— DMP 200	6.75	8.50	—
	— DMP 230/520	4.00	5.25	—
	— DMP 2100	5.75	—	—
	— DMP 410/510	5.00	7.00	—
	— DMP 430	12.00	—	—
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Epson MX80/LX800		3.75	4.25	6.75
Okidata 182/192		6.50	7.50	—
Panasonic K-XP 1090		6.75	7.75	—
Seikosha SP 800/1000		5.25	6.50	7.95
Star NX10/NL10		5.00	6.00	7.95
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Pennsylvania				
Easton	ASCII-=80=-BBS	(215) 252-1608	300-E-7-1	Nevin Keller
Norristown	Graphics Pub BBS[7]	(215) 277-6951	300/1200/2400-N-8-1	Bob Montowski
Reading	The Glass Menageric	(215) 376-1819	300/1200/2400-N-8-1	H. Allen Cravener
Rhode Island				
Providence	Tempo BBS	(401) 456-9394	300 to 2400-N-8-1	Arthur Mendoca
Tennessee				
Memphis	MCCUG BBS	(901) 458-9584	300/1200-E-7-1	B.J. Seaton
Utah				
Salt Lake	Data Warehouse of Salt Lake	(801) 969-6051	1200-N-8-1	
West Valley City	The CoCoshop BBS	(801) 250-1941	300/1200-N-8-1	Dennis & Terry Gray
Virginia				
Henry	Colorama 86 V4.0[8]	(703) 365-2018	1200-N-8-1	Ricky Sutphin
Washington				
Kennewick	The Time Machine	(509) 586-2559 or 586-2160	1200-E-7-1	Paul Alger
Kent	The CoCo Connection	(206) 854-3744	300/1200/2400-N-8-1	Corrie Bender
Spokane	Data Warehouse of Spokane	(509) 325-6787	300/1200-E-7-1	Dennis Mott
Wisconsin				
Gays Mills	CoCo BBS	(608) 735-4509	300/1200/2400-E-7-1	Robert & Daven Howard
Marshall	Madison Area Tandy Users BBS	(608) 274-6922 or 655-3806	300/1200/2400-N-8-1	
Canada:				
Alberta				
Letchbridge	Public BBS System of Letchbridge	(403) 329-6438	300/1200/2400-N-8-1	Dieter Rossman
Nova Scotia				
New Waterford	Chip to Chip BBS[9]	(902) 539-7743	300/1200-baud	Allan Jones
Ontario				
Angus	ECCC BBS	(705) 424-7570	300/1200/2400-N-8-1	Eldon Doucete
Scarborough	Remote Data Systems-09 (RDS-09)	(416) 283-7521	300/1200/2400-N-8-1	Doug Wright
Quebec				
La Tuque	Babillard du Club	(819) 523-4329	300-N-7-1	Renald Martin

Notes:

[1]The Exchange is up from 6 p.m. to 6 a.m. Monday through Friday, and 24 hours Saturday and Sunday.

[2]Hackers BBS is up from 9:30 p.m. to 10 a.m., 7 days.

[3]The Computer Rama BBS is up from 10 p.m. to 1 p.m., 7 days.

[4]Hardsector BBS is up from 10:30 p.m. to 5 p.m., 7 days.

[5]Additional parameter information unavailable for CoCo master's BBS.

[6]The Rainbow's End is up from 6 p.m. to 11:30 p.m., Friday, Saturday and Sunday.

[7]Graphics Pub BBS is up from 7 p.m. to 7 a.m., 7 days.

[8]Colorama 86 V4.0 is up from 11:30 p.m. to 11:30 a.m., 7 days.

[9]Additional parameter information unavailable for Chip to Chip BBS.

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Modify an old favorite to use on the CoCo 3

A *Remote* Update

By Paul Alger

I've been running my own BBS for a few years and have always used THE RAINBOW'S *Remote* (November '85, Page 106) and *Remot232* (November '86, Page 70) as my terminal drivers. When I purchased my new CoCo 3, however, I found that the *Remote* programs were not compatible with 40- and 80-column screens. To alleviate this problem, I modified *Remot232* to allow the use of 40- and 80-column screens *and* to provide scroll- and CLS-protected areas on all screens. For those of you who would like to use the *Remote* programs in a 40- or 80-column format, allow me to present *Remote 3*.

Remote 3 will work on any CoCo that has at least 32K of memory. The program includes all of the *Remote* pro-

Paul Alger, SysOp for the Time Machine BBS, holds a bachelor's degree in audio engineering. Paul currently works as a professional musician.

Table 1

***Remote 3* Pokes**

Location	Description
7D00	If 7D00 contains 1, the BREAK key is disabled from the remote user. If it contains 0, the remote user can use the BREAK key to break into BASIC.
7D01	If 7D01 contains 1, the incoming character is displayed in the right-hand corner of the scroll-protected area. If it contains 0, the feature is turned off.
7D02	If 7D02 contains 1, line feeds are sent with a carriage return. If it contains 0, no line feeds are sent.
7D03	If 7D03 contains 0, normal characters are sent to the remote terminal. Any other value echoes the character with that ASCII code to the remote terminal. POKE-&H7D03,65 will echo all A's to the remote terminal no matter what you see on your terminal screen. (Use this feature for password entry.)
7D04	If 7D04 contains 0, input from the remote terminal is not affected. A 1, however, converts the input from the remote terminal to all uppercase, and a 2 converts the input from the remote terminal to all lowercase.
7D05	This location works the same as 7D04 except that instead of the input, the output from the remote terminal is converted.
7D06	Cursor value (32-column screen only).
7D07 & 7D08	Used for scroll-protection in *Remote*. Poking here has no effect on *Remote 3*.

Clock Pokes

Location	Description
7F00 to 7F14	These locations contain a 20-byte CLS- and scroll-protected area. Poke the string to be protected into this area.
7F1D	Each time the clock reaches 24:00 (midnight), this location increments by 1. Peek this location to roll over the date.
7F1E	Location 7F1E contains a count-down timer. When a user logs on, poke the number of minutes you allow the user to remain online. Periodically peek this location. Time is up when the value is 0.
7F20	If 7F20 contains 1, the clock display is turned off. A 0 indicates that the display is on.
7F21	If 7F21 contains 0, the string display is turned off. A 1 indicates that the string is displayed.
7F22	If 7F22 contains 0, the "chat" flag is turned off. A 1 indicates that the flag is on. The "chat" flag flashes in the right-hand corner of the scroll-protected area.
7F23	This is the clock speed. The default value is 50. Poking any other value in this location changes the speed of the clock. The higher the number, the slower the clock.
7FD5	This location will invert the clock display on the 32-column screen only. If the location contains 48, the clock will appear green on a black background. If it is 112, the clock will appear black on a green background. Any other value will produce garbage in the clock display.

Listing 1:

```
00100 ********************************
00110 *  REMOTE 3 FOR 232 PAC *
00120 * A TERMINAL DRIVER FOR *
00130 * THE COCO 3 & RS232 PAC*
00140 * FROM THE ORIGINAL     *
00150 * REMOTE PROGRAM BY     *
00160 * DAN DOWNARD RAINBOW   *
00170 *       11/83           *
00180 * MODIFIED BY           *
00190 * SCOTT TAYLOR RAINBOW  *
00200 *       11/85           *
00210 * MODIFIED FOR RS 232 BY*
00220 * MARK CROSBY RAINBOW   *
00230 *       11/86           *
```

grams' original bells and whistles except scroll-protection. To remedy this loss, I have included a software clock that allows 20 characters of scroll- and CLS-protection.

Included with this article are four listings. The first is the assembly listing for the *Remote 3*. This version of the program is for use with the RS-232 pack, and the pack *must be installed* before the program will work properly. (I do have a serial-port version of *Remote 3* and would be glad to send it to anyone who wants it. To receive that listing, please send me an SASE, a blank disk and the necessary postage. The address appears at the end of the article.)

Listing 2 is a software clock, which uses interrupts to allow the clock to be updated during disk access. The clock program provides CLS- and scroll-protection as well as a few other features I wanted for my BBS operation.

Listing 3 is a BASIC loader that creates *Remote 3* and the software clock in memory. It then saves these two programs as one *workable* ML file on tape or disk.

Finally, I've included a short demonstration program, Listing 4. This demonstration offers a few examples of the program's various uses, including those for the new features. This demo program can only be used on a CoCo 3 and online at 300 baud.

All program features are listed with their corresponding memory locations in Table 1. The descriptions presented for each location include both the program feature and the values used to achieve these results.

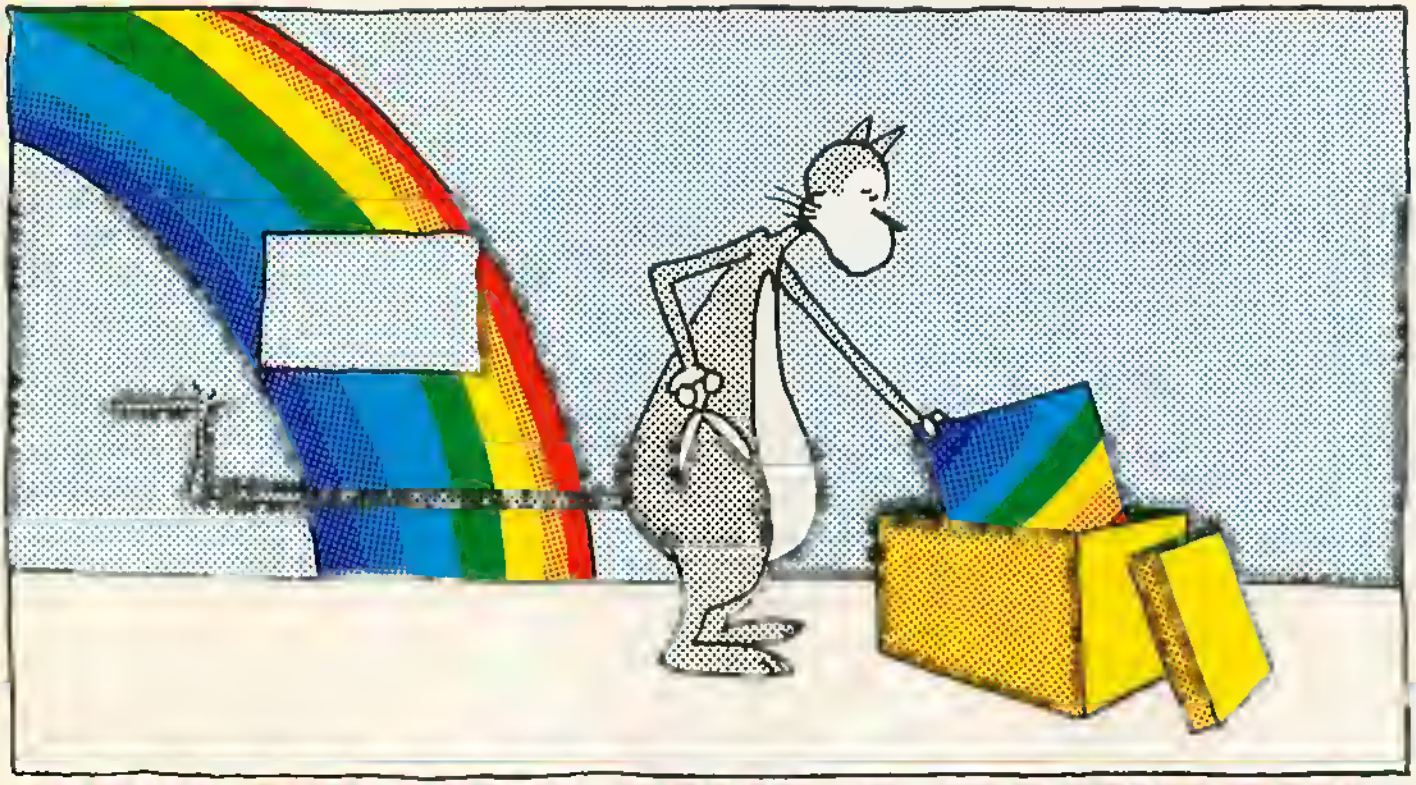
Remote 3 does have one small annoyance. The cursor does not self-destruct when the backspace key is pressed. If that bothers you, type the following:

```
POKE&H7D06,96
```

The bug (and the cursor) will disappear.

If you would like to sample a BBS that uses this terminal driver, give my BBS — the Time Machine — a try. Call (509) 586-2559 or (509) 586-2160. The BBS runs at 7-bit, 1 stop bit, even parity, 300/1200 baud, 24 hours a day. The BBS features a multi-player D & D game, a multi-player *World War* game and an updated version of my *Galactic Conflict* game. Give me a call sometime.

(Questions or comments concerning these programs may be directed to the author at 1303 West 26th, Kennewick, WA 99337. Please enclose an SASE when requesting a reply.) □



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```
                        00240 * MODIFIED FOR COCO 3 BY*
                        00250 * PAUL ALGER            *
                        00252 *        6/88           *
                        00254 ****************************
7D00                    00260          ORG     $7D00
                        00270 *EQUATES FOR ROM AND RAM
          016A          00280 IHOOK    EQU     $016A
          0167          00290 OHOOK    EQU     $0167
          A000          00300 POLCAT   EQU     $A000
          006F          00310 DEV      EQU     $6F
          0070          00320 FLAG     EQU     $70
7D00      01            00330 BREAK    FCB     $01
7D01      01            00340 CORNER   FCB     $01
7D02      01            00350 LFFLG    FCB     $01
7D03      00            00360 PRTFLG   FCB     $00
7D04      00            00370 ICASE    FCB     $00
7D05      00            00380 OCASE    FCB     $00
7D06      9F            00390 CURSOR   FCB     $9F
7D07      0400          00400 NOSCRL   FDB     $400
7D09      00            00410 COUNTR   FCB     $00
7D0A                    00420 TABLE    RMB     $28
                        00430 *INITIALIZE RAM HOOKS
7D32 BE   0168          00440 START    LDX     1+OHOOK
7D35 AF   8D 008B       00450          STX     1+ORET2,PCR
7D39 BE   016B          00460          LDX     1+IHOOK
7D3C AF   8D 00F1       00470          STX     1+IRET2,PCR
7D40 86   7E            00480          LDA     #$7E
7D42 B7   0167          00490          STA     OHOOK
7D45 B7   016A          00500          STA     IHOOK
7D48 30   8D 0048       00510          LEAX    OUT,PCR
7D4C BF   0168          00520          STX     1+OHOOK
7D4F 30   8D 0073       00530          LEAX    IN,PCR
7D53 BF   016B          00540          STX     1+IHOOK
                        00550 * MOVE TABLE OF ROM ADDRESS
                        00560 *SET INKEY$ TO ROM BASED ROUTINE
7D56 8E   AA29          00570 MOVTBL   LDX     #$AA29
7D59 31   8C AE         00580          LEAY    TABLE,PCR
7D5C 10BF 0128          00590          STY     $128
7D60 EC   81            00600 GETADD   LDD     ,X++
7D62 ED   A1            00610          STD     ,Y++
7D64 8C   AA51          00620          CMPX    #$AA51
7D67 26   F7            00630          BNE     GETADD
7D69 30   8D 0005       00640          LEAX    INKEY,PCR
7D6D 31   3C            00650          LEAY    -4,Y
7D6F AF   A4            00660          STX     ,Y
7D71 39                 00670 RET      RTS
                        00680 *CHECK KEYBOARD AND
                        00690 *RS232 FOR INKEY$ 255
                        00700 *TIMES IF NOTHING IN $87
7D72 96   87            00710 INKEY    LDA     <$87
7D74 26   15            00720          BNE     YES
7D76 86   FF            00730          LDA     #$FF
7D78 B7   7D09          00740          STA     COUNTR
7D7B AD   9F A000       00750 INKEY2   JSR     [POLCAT]
7D7F 26   0A            00760          BNE     YES
7D81 BD   7DE6          00770          JSR     REMIN
7D84 26   05            00780          BNE     YES
7D86 7A   7D09          00790          DEC     COUNTR
7D89 26   F0            00800          BNE     INKEY2
                        00810 *CHARACTER IN A REGISTER
                        00820 *BRANCH IF BREAK (A=$03)
                        00830 *CONVERT TO STRING
7D8B 81   03            00840 YES      CMPA    #$03
```


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Tandy 1400LT 768K 2 Drives	1335.00
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VM-4 Monochrome Green	95.00
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CM-5 Color RGB	220.00
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Color Computer Drive 0	225.00
5 1/4" External Drive 1000EX	180.00
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Zucker 30 Meg Hardcard	395.00
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Zucker Serial Board	45.00
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DMP-106 Dot-Matrix	165.00
DMP-132 Dot-Matrix	285.00
DWP-230 Daisy Wheel	345.00
Epson LX-800 Dot-Matrix	205.00
Epson FX-850 Dot-Matrix	375.00
Epson FX-1050 Dot-Matrix	540.00
Epson LQ-500 Dot-Matrix	375.00
Epson LQ-850 Dot-Matrix	579.00

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We carry more items than listed here.

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. C.O.D. accepted add 2% (minimum charge $10.00). M.C., Visa add 2%. All non defective items require return merchandise authorization. Call for RMA. Narrow ballot receiving. Delivery is subject to product availability. Add 1½% for shipping and handling. $5.00 minimum charge.

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Monday thru Friday 9am - 5pm EST.

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About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette or disk) to:

THE RAINBOW
One-Liner Contest
P.O. Box 385
Prospect, KY 40059

```
7D8D 1Ø27 3Ø78     ØØ85Ø          LBEQ    $AEØ9
7D91 7E   A56B     ØØ86Ø          JMP     $A56B
                   ØØ87Ø *OUTPUT CHARACTER IF DEV=Ø
                   ØØ88Ø *INSERT LINE FEEDS IF NEEDED
                   ØØ89Ø *USE NEW PRINT ROUTINE
7D94 34   Ø6       ØØ9ØØ OUT      PSHS    A,B
7D96 ØD   6F       ØØ91Ø          TST     <DEV
7D98 26   27       ØØ92Ø          BNE     ORET1
7D9A 81   Ø8       ØØ93Ø          CMPA    #$Ø8
7D9C 27   1A       ØØ94Ø          BEQ     RMOUT2
7D9E 81   ØD       ØØ95Ø          CMPA    #$ØD
7DAØ 26   ØE       ØØ96Ø          BNE     REMOUT
                   ØØ97Ø *CHECK IF LINE FEEDS ARE
                   ØØ98Ø *TO BE SENT TO REMO TERM
7DA2 F6   7DØ2     ØØ99Ø          LDB     LFFLC
7DA5 27   11       Ø1ØØØ          BEQ     RMOUT2
7DA7 86   ØA       Ø1Ø1Ø          LDA     #$ØA
7DA9 BD   7E33     Ø1Ø2Ø          JSR     RSOUT
7DAC 86   ØD       Ø1Ø3Ø          LDA     #$ØD
7DAE 2Ø   Ø8       Ø1Ø4Ø          BRA     RMOUT2
                   Ø1Ø5Ø *ECHO CHARACTER IN PRTFLG
                   Ø1Ø6Ø *IF IT IS NOT = TO Ø
7DBØ F6   7DØ3     Ø1Ø7Ø REMOUT   LDB     PRTFLC
7DB3 27   Ø3       Ø1Ø8Ø          BEQ     RMOUT2
7DB5 B6   7DØ3     Ø1Ø9Ø          LDA     PRTFLC
                   Ø11ØØ *CHECK OUTPUT FOR UPPER-C
                   Ø111Ø *OR LOWER-C AND SEND IT
7DB8 F6   7DØ5     Ø112Ø RMOUT2   LDB     OCASE
7DBB BD   7EØA     Ø113Ø          JSR     CKCASE
7DBE BD   7E33     Ø114Ø          JSR     RSOUT
7DC1 35   Ø6       Ø115Ø ORET1    PULS    A,B
7DC3 7E   7D71     Ø116Ø ORET2    JMP     RET
                   Ø2ØØØ *INPUT FROM KEYBOARD OR
                   Ø2Ø1Ø *RS-232 IF DEV=Ø
                   Ø2Ø2Ø *USE RSIN FOR REMOTE INPUT
7DC6 B6   7DØ6     Ø2Ø3Ø IN       LDA     CURSOR
7DC9 A7   9F ØØ88  Ø2Ø4Ø          STA     [$88]
7DCD ØF   7Ø       Ø2Ø5Ø          CLR     <FLAG
7DCF ØD   6F       Ø2Ø6Ø          TST     <DEV
7DD1 26   5D       Ø2Ø7Ø          BNE     IRET2
7DD3 32   62       Ø2Ø8Ø          LEAS    2,S
7DD5 34   15       Ø2Ø9Ø          PSHS    B,CC,X
7DD7 AD   9F AØØØ  Ø21ØØ IN1      JSR     [POLCAT]
7DDB 27   Ø2       Ø211Ø          BEQ     RSCHK
7DDD 2Ø   4F       Ø212Ø          BRA     NOCHNG
7DDF BD   7DE6     Ø213Ø RSCHK    JSR     REMIN
7DE2 27   F3       Ø214Ø          BEQ     IN1
7DE4 2Ø   42       Ø215Ø          BRA     IRET1
7DE6 F6   FF69     Ø216Ø REMIN    LDB     $FF69
7DE9 C4   Ø8       Ø217Ø          ANDB    #$Ø8
7DEB 27   18       Ø218Ø          BEQ     ZEROA
                   Ø219Ø *RS-232 INPUT FROM CART
7DED C4   Ø7       Ø22ØØ RSAN     ANDB    #$Ø7
7DEF 26   14       Ø221Ø          BNE     ZEROA
7DF1 B6   FF68     Ø222Ø          LDA     $FF68
                   Ø223Ø *STORE CHAR IN UPPER RIGHT
                   Ø224Ø *CORNER OF 32 COL. SCREEN
7DF4 F6   7DØ1     Ø225Ø          LDB     CORNER
7DF7 27   Ø3       Ø226Ø          BEQ     CHKBRK
7DF9 B7   Ø41F     Ø227Ø          STA     $41F
                   Ø228Ø *CHECK FOR BREAK DISABLE
                   Ø229Ø *AND FOR BREAK SIGNAL
                   Ø23ØØ *FROM REMOTE TERMINAL
```

The COCO hardware store

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```
7DFC F6   7DØØ     Ø231Ø CHKBRK  LDB     BREAK
7DFF 27   Ø6       Ø232Ø         BEQ     NOTBRK
7EØ1 81   Ø3       Ø233Ø         CMPA    #$Ø3
7EØ3 26   Ø2       Ø234Ø         BNE     NOTBRK
7EØ5 4F            Ø235Ø ZEROA   CLRA
7EØ6 39            Ø236Ø         RTS
7EØ7 F6   7DØ4     Ø237Ø NOTBRK  LDB     ICASE
                   Ø238Ø *CHECK IF CHAR SHOULD BE
                   Ø239Ø *UPPER OR LOWERCASE AND
                   Ø24ØØ *CHANGE IT ACCORDINGLY
7EØA C1   Ø1       Ø241Ø CKCASE  CMPB    #$Ø1
7EØC 26   ØB       Ø242Ø         BNE     CMPB2
7EØE 81   61       Ø243Ø         CMPA    #$61
7E1Ø 25   15       Ø244Ø         BLO     RET2
7E12 81   7A       Ø245Ø         CMPA    #$7A
7E14 22   11       Ø246Ø         BHI     RET2
7E16 8Ø   2Ø       Ø247Ø         SUBA    #$2Ø
7E18 39            Ø248Ø         RTS
7E19 C1   Ø2       Ø249Ø CMPB2   CMPB    #$Ø2
7E1B 26   ØA       Ø25ØØ         BNE     RET2
7E1D 81   41       Ø251Ø         CMPA    #$41
7E1F 25   Ø6       Ø252Ø         BLO     RET2
7E21 81   5A       Ø253Ø         CMPA    #$5A
7E23 22   Ø2       Ø254Ø         BHI     RET2
7E25 8B   2Ø       Ø255Ø         ADDA    #$2Ø
7E27 39            Ø256Ø RET2    RTS
7E28 C6   6Ø       Ø257Ø IRET1   LDB     #$6Ø
7E2A E7   9F ØØ88  Ø258Ø         STB     [$88]
7E2E 35   95       Ø259Ø NOCHNG  PULS    B,CC,X,PC
7E3Ø 7E   7D71     Ø26ØØ IRET2   JMP     RET
7E33 34   Ø4       Ø261Ø RSOUT   PSHS    B
7E35 F6   FF69     Ø262Ø RSOUT1  LDB     $FF69
7E38 C4   1Ø       Ø263Ø         ANDB    #$1Ø
7E3A 27   F9       Ø264Ø         BEQ     RSOUT1
7E3C B7   FF68     Ø265Ø         STA     $FF68
7E3F 35   Ø4       Ø266Ø         PULS    B
7E41 39            Ø267Ø         RTS
                   Ø268Ø *
7E42               Ø269Ø ZZZZ    ********
           7D32    Ø27ØØ         END     START

ØØØØØ TOTAL ERRORS
```

Listing 2:

```
                   ØØ1ØØ ****************************
                   ØØ11Ø *  CLOCK FOR REMOTE 3    *
                   ØØ12Ø *      BY PAUL ALCER     *
                   ØØ125 *WITH SPECIAL THANKS TO *
                   ØØ13Ø *    WAYNE LAFFARDY      *
                   ØØ17Ø ****************************
7EB4               ØØ18Ø          ORG     $7EB4
                   ØØ19Ø *SUBROUTINE FOR COCO3
                   ØØ2ØØ *CONVERTS 32 CHAR TO
                   ØØ21Ø *4Ø-8Ø COLM CHARACTERS.
7EB4 BE   EØØØ     ØØ22Ø COCO3   LDX     $EØØØ
7EB7 8C   ØØE6     ØØ23Ø         CMPX    #$ØØE6
7EBA 26   4Ø       ØØ24Ø         BNE     RETCO3
7EBC 96   E7       ØØ25Ø         LDA     $E7
7EBE 27   3C       ØØ26Ø         BEQ     RETCO3
7EC0 8E   2F6Ø     ØØ27Ø         LDX     #$2F6Ø
7EC3 81   Ø2       ØØ28Ø         CMPA    #$Ø2
7EC5 27   Ø3       ØØ29Ø         BEQ     COL8Ø
7EC7 8E   279Ø     ØØ3ØØ         LDX     #$279Ø
```

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Products listed in the Holiday Shopper's Guide (Page 41) are available from the following companies:

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Burke & Burke
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Palatine, IL 60078
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Canada H3L 2E8
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Colorware
242-W West Ave.
Darien, CT 06820
(203) 656-1806

Curtis/PCA
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Ventura, CA 93303
(805) 650-8020

Datum Manufacturing
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Los Angeles, CA 90066
(213) 313-0141

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Milton, Ontario
Canada L9T 2X8
(416) 878-8358

Foto-Wear!, Inc.
77 Milltown Road
East Brunswick, NJ 08816
(201) 257-6549

Gimmesoft
P.O. Box 421
Perry Hall, MD 21128
(301) 256-7558

(continued on Page 120)

```
7ECA 108E 0400     00310 COL80    LDY     #$400
7ECE 86   36       00320          LDA     #$36
7ED0 B7   FFA1     00330          STA     $FFA1
                   00340 *TRANSFER DATA FROM 32
                   00350 *COLUMN SCREEN TO 40-80
                   00360 *COLUMN SCREEN.
7ED3 A6   A0       00370 COPY     LDA     ,Y+
7ED5 81   1B       00380          CMPA    #27
7ED7 25   06       00390          BLO     ADD96
7ED9 81   5A       00400          CMPA    #90
7EDB 22   06       00410          BHI     ADD64
7EDD 20   06       00420          BRA     STORE
7EDF 8B   60       00430 ADD96    ADDA    #96
7EE1 20   02       00440          BRA     STORE
7EE3 8B   40       00450 ADD64    ADDA    #64
7EE5 A7   81       00460 STORE    STA     ,X++
7EE7 108C 042D     00470          CMPY    #$420
7EEB 26   E6       00480          BNE     COPY
                   00490 *CLEAR CHAT FLAG
7EED B6   7F22     00500          LDA     CHAT
7EF0 26   05       00510          BNE     GIMME
7EF2 86   60       00520          LDA     #96
7EF4 B7   041E     00530          STA     $41E
7EF7 86   39       00540 GIMME    LDA     #$39
7EF9 B7   FFA1     00550          STA     $FFA1
7EFC B6   FF03     00560 RETCO3   LDA     $FF03
7EFF 39            00570          RTS
                   00580 *SET UP STRING AREA AND
                   00590 *VARIABLES
7F00               00600 STRING   RMB     $15
7F15      00       00610 HOUR1    FCB     $00
7F16      00       00620 HOUR2    FCB     $00
7F17      0A       00630 COLON1   FCB     $0A
7F18      00       00640 MIN1     FCB     $00
7F19      00       00650 MIN2     FCB     $00
7F1A      0A       00660 COLON2   FCB     $0A
7F1B      00       00670 SEC1     FCB     $00
7F1C      00       00680 SEC2     FCB     $00
7F1D      00       00690 DAY      FCB     $00
7F1E      00       00700 CLOCK2   FCB     $00
7F1F      00       00710 HOUR     FCB     $00
7F20      00       00720 DSPLAY   FCB     $00
7F21      00       00730 DISPLN   FCB     $00
7F22      00       00740 CHAT     FCB     $00
7F23      32       00750 CLKSPD   FCB     $32
7F24      00       00760 COUNT    FCB     $00
                   00770 *SET UP HOOKS
7F25 8E   7F33     00780 INIT     LDX     #START
7F28 BF   010D     00790          STX     $010D
7F2B 86   35       00800          LDA     #$35
7F2D B7   FF03     00810          STA     $FF03
7F30 1C   EF       00820          ANDCC   #$EF
7F32 39            00830          RTS
                   00840 *SET UP CLOCK TICK AND
                   00850 *INCREMENT CLOCK
7F33 7C   7F24     00860 START    INC     COUNT
7F36 B6   7F24     00870          LDA     COUNT
7F39 B1   7F23     00880          CMPA    CLKSPD
7F3C 25   6A       00890          BCS     DSPLY
7F3E 7F   7F24     00900          CLR     COUNT
7F41 7C   7F1C     00910          INC     SEC2
7F44 B6   7F1C     00920          LDA     SEC2
```

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(continued from Page 118)

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MichTron
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Mesa, AZ 85201
(602) 827-0107

Zebra Systems, Inc.
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Woodhaven, NY 11421
(718) 296-2385

```
7F47 81   ØA       ØØ93Ø          CMPA    #$ØA
7F49 25   5D       ØØ94Ø          BCS     DSPLY
7F4B 7F   7F1C     ØØ95Ø          CLR     SEC2
7F4E 7C   7F1B     ØØ96Ø          INC     SEC1
7F51 B6   7F1B     ØØ97Ø          LDA     SEC1
7F54 81   Ø6       ØØ98Ø          CMPA    #$Ø6
7F56 25   5Ø       ØØ99Ø          BCS     DSPLY
7F58 7F   7F1B     Ø1ØØØ          CLR     SEC1
7F5B B6   7F1E     Ø1Ø1Ø          LDA     CLOCK2
7F5E 81   ØØ       Ø1Ø2Ø          CMPA    #$ØØ
7F6Ø 27   Ø4       Ø1Ø3Ø          BEQ     START1
7F62 4A            Ø1Ø4Ø          DECA
7F63 B7   7F1E     Ø1Ø5Ø          STA     CLOCK2
7F66 7C   7F19     Ø1Ø6Ø START1   INC     MIN2
7F69 B6   7F19     Ø1Ø7Ø          LDA     MIN2
7F6C 81   ØA       Ø1Ø8Ø          CMPA    #$ØA
7F6E 25   38       Ø1Ø9Ø          BCS     DSPLY
7F7Ø 7F   7F19     Ø11ØØ          CLR     MIN2
7F73 7C   7F18     Ø111Ø          INC     MIN1
7F76 B6   7F18     Ø112Ø          LDA     MIN1
7F79 81   Ø6       Ø113Ø          CMPA    #$Ø6
7F7B 25   2B       Ø114Ø          BCS     DSPLY
7F7D 7F   7F18     Ø115Ø          CLR     MIN1
7F8Ø 7C   7F1F     Ø116Ø          INC     HOUR
7F83 7C   7F16     Ø117Ø          INC     HOUR2
7F86 B6   7F1F     Ø118Ø          LDA     HOUR
7F89 81   18       Ø119Ø          CMPA    #24
7F8B 25   ØE       Ø12ØØ          BCS     GO
7F8D 7F   7F1F     Ø121Ø          CLR     HOUR
7F9Ø 7F   7F15     Ø122Ø          CLR     HOUR1
7F93 7F   7F16     Ø123Ø          CLR     HOUR2
                   Ø124Ø *INCREMENT DAY FLAG
7F96 7C   7F1D     Ø125Ø          INC     DAY
7F99 2Ø   ØD       Ø126Ø          BRA     DSPLY
7F9B B6   7F16     Ø127Ø GO       LDA     HOUR2
7F9E 81   ØA       Ø128Ø          CMPA    #$ØA
7FAØ 25   Ø6       Ø129Ø          BCS     DSPLY
7FA2 7F   7F16     Ø13ØØ          CLR     HOUR2
7FA5 7C   7F15     Ø131Ø          INC     HOUR1
                   Ø132Ø *CHECK IF DISPLAY IS ON OR
                   Ø133Ø *OFF
7FA8 B6   7F2Ø     Ø134Ø DSPLY    LDA     DSPLAY
7FAB 26   31       Ø135Ø          BNE     RETURN
                   Ø136Ø *INCREMENT CHAT FLAG IF SET
7FAD B6   7F22     Ø137Ø          LDA     CHAT
7FBØ 27   Ø3       Ø138Ø          BEQ     DSPLYØ
7FB2 7C   Ø41E     Ø139Ø          INC     $41E
                   Ø14ØØ *DISPLAY STRING IF DISPLN SET
7FB5 B6   7F21     Ø141Ø DSPLYØ   LDA     DISPLN
7FB8 27   11       Ø142Ø          BEQ     DSPLY2
7FBA 8E   Ø4ØØ     Ø143Ø          LDX     #$4ØØ
7FBD 1Ø8E 7FØØ     Ø144Ø          LDY     #$7FØØ
7FC1 A6   AØ       Ø145Ø DSPLY1   LDA     ,Y+
7FC3 A7   8Ø       Ø146Ø          STA     ,X+
7FC5 1Ø8C 7F15     Ø147Ø          CMPY    #$7F15
7FC9 25   F6       Ø148Ø          BCS     DSPLY1
                   Ø149Ø *PRINT CURRENT TIME IF DISPLY SET
7FCB 8E   Ø416     Ø15ØØ DSPLY2   LDX     #$416
7FCE 1Ø8E 7F15     Ø151Ø          LDY     #$7F15
7FD2 A6   AØ       Ø152Ø DSPLY3   LDA     ,Y+
7FD4 8B   3Ø       Ø153Ø          ADDA    #$3Ø
7FD6 A7   8Ø       Ø154Ø          STA     ,X+
```

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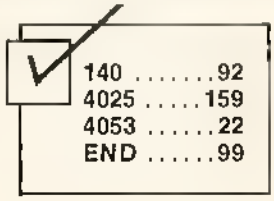
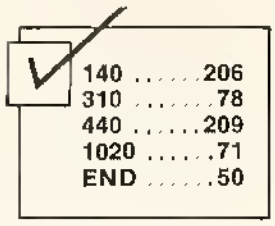
```
7FD8 1Ø8C 7F1D     Ø155Ø          CMPY    #$7F1D
7FDC 25   F4       Ø156Ø          BGS     DSPLY3
7FDE 17   FED3     Ø157Ø RETURN   LBSR    COCO3
7FE1 2A   1C       Ø158Ø          BPL     GO3
7FE3 B6   FFØ2     Ø159Ø          LDA     $FFØ2
7FE6 B6   Ø985     Ø16ØØ          LDA     $Ø985
7FE9 27   11       Ø161Ø          BEQ     GO4
7FEB 4A            Ø162Ø          DECA
7FEC B7   Ø985     Ø163Ø          STA     $Ø985
7FEF 26   ØB       Ø164Ø          BNE     GO4
7FF1 B6   Ø986     Ø165Ø          LDA     $Ø986
7FF4 84   BØ       Ø166Ø          ANDA    #$BØ
7FF6 B7   Ø986     Ø167Ø          STA     $Ø986
7FF9 B7   FF4Ø     Ø168Ø          STA     $FF4Ø
7FFC 7E   8955     Ø169Ø GO4      JMP     $8955
7FFF 3B            Ø17ØØ GO3      RTI
          ØØØØ     Ø171Ø          END

ØØØØØ TOTAL ERRORS
```



Listing 3: BASLOAD

```
1 'BASIC LOADER FOR REMOTE 3
5 CLEAR1ØØØ,&H7CFF
1Ø CLS(Ø):PRINT@171,"POKING M/L"
;
2Ø Z5=&H7DØØ:LN=3999:FORZ=1TO41:
READA$,B$:Z4=VAL("&H"+B$):LN=LN+
1
3Ø Z3=Ø:PRINT@228,"READING DATA
LINE"LN;:FORZ1=1TO LEN(A$) STEP2
4Ø Z2=VAL("&H"+MID$(A$,Z1,2)):Z3
=Z3+Z2:POKEZ5,Z2:Z5=Z5+1
5Ø NEXTZ1:IFZ3<>Z4 THENPRINT@416
,"DATA ERROR IN LINE"LN;:END
6Ø NEXTZ
7Ø Z5=&H7EB4:LN=4999:FORZ=1TO42:
READA$,B$:Z4=VAL("&H"+B$):LN=LN+
1
8Ø Z3=Ø:PRINT@228,"READING DATA
LINE"LN;:FORZ1=1TO LEN(A$) STEP2
9Ø Z2=VAL("&H"+MID$(A$,Z1,2)):Z3
=Z3+Z2:POKEZ5,Z2:Z5=Z5+1
1ØØ NEXTZ1:IFZ3<>Z4 THENPRINT@41
6,"DATA ERROR IN LINE"LN:END
11Ø NEXTZ
12Ø CLS(Ø)
13Ø SAVEM"REMOTE3.BIN",&H7DØØ,&H
7FFF,&H7D32
14Ø POKE65386,1Ø7:POKE65387,54'
CONFIGURE RS232 PAC FOR 7-E-1 @
3ØØ BAUD
15Ø CLS:EXEC&H7D32:PRINT"REMOTE
3 IS NOW INSTALLED AND   RUNNING
 AT 3ØØ BAUD!":END
4ØØØ DATA Ø1Ø1Ø1ØØØØØØ9FØ4,A6
4ØØ1 DATA ØØØØFFFFFFFFFFFF,5FA
4ØØ2 DATA FFFFFFFFFFFFFFFF,7F8
4ØØ3 DATA FFFFFFFFFFFFFFFF,7F8
4ØØ4 DATA FFFFFFFFFFFFFFFF,7F8
4ØØ5 DATA FFFFFFFFFFFFFFFF,7F8
4ØØ6 DATA FFFFBEØ168AF8DØØ,461
4ØØ7 DATA 8BBEØ16BAF8DØØF1,3E2
4ØØ8 DATA 867EB7Ø167B7Ø16A,345
4ØØ9 DATA 3Ø8DØØ48BFØ1683Ø,25D
4Ø1Ø DATA 8DØØ73BFØ16B8EAA,363
4Ø11 DATA 29318CAE1ØBFØ128,28C
4Ø12 DATA EC81EDA18CAA5126,4A8
4Ø13 DATA F73Ø8DØØØ5313CAF,2D5
4Ø14 DATA A4399687261586FF,3BA
4Ø15 DATA B77DØ9AD9FAØØ26,34F
4Ø16 DATA ØABD7DE626Ø57A7D,34C
4Ø17 DATA Ø926FØ81Ø31Ø273Ø,2ØA
4Ø18 DATA 787EA56B34Ø6ØD6F,2BC
4Ø19 DATA 262781Ø8271A81ØD,1A5
4Ø2Ø DATA 26ØEF67DØ2271186,267
4Ø21 DATA ØABD7E3386ØD2ØØ8,233
4Ø22 DATA F67DØ327Ø3B67DØ3,2D6
4Ø23 DATA F67DØ5BD7EØABD7E,3F8
4Ø24 DATA 3335Ø67E7D71B67D,3ØD
4Ø25 DATA Ø6A79FØØ88ØF7ØØD,26Ø
4Ø26 DATA 6F265D32623415AD,27C
4Ø27 DATA 9FAØØØ27Ø22Ø4FBD,294
4Ø28 DATA 7DE627F32Ø42F6FF,4D4
4Ø29 DATA 69C4Ø82718C4Ø726,265
4Ø3Ø DATA 14B6FF68F67DØ127,3CC
4Ø31 DATA Ø3B7Ø41FF67DØØ27,277
4Ø32 DATA Ø681Ø326Ø24F39F6,23Ø
4Ø33 DATA 7DØ4C1Ø126ØB8161,256
4Ø34 DATA 2515817A22118Ø2Ø,2Ø8
4Ø35 DATA 39C1Ø226ØA814125,213
4Ø36 DATA Ø6815A22Ø28B2Ø39,1E9
```

```
4Ø37 DATA C66ØE79FØØ883595,3FE
4Ø38 DATA 7E7D7134Ø4F6FF69,4Ø2
4Ø39 DATA C41Ø27F9B7FF6835,447
4Ø4Ø DATA Ø439FF,13C
4Ø41 DATA BEEØØØ8CØØE6264Ø,376
4Ø42 DATA 96E7273C8E2F6Ø81,37E
4Ø43 DATA Ø227Ø38E279Ø1Ø8E,2ØF
4Ø44 DATA Ø4ØØ8636B7FFA1A6,3BD
4Ø45 DATA AØ811B25Ø6815A22,264
4Ø46 DATA Ø62ØØ68B6Ø2ØØ28B,1C4
4Ø47 DATA 4ØA7811Ø8CØ42Ø26,24E
4Ø48 DATA E6B67F2226Ø5866Ø,34E
4Ø49 DATA B7Ø41E8639B7FFA1,3EF
4Ø5Ø DATA B6FFØ3395254434C,326
4Ø51 DATA 4F434B2Ø42592Ø5Ø,2Ø8
4Ø52 DATA 41554C2Ø414C4745,21B
4Ø53 DATA 52ØØØØØAØØØØØAØØ,66
4Ø54 DATA ØØØØØØØØØØØØØ32,32
4Ø55 DATA ØØ8E7F33BFØ1ØD86,293
4Ø56 DATA 35B7FFØ31CEF397C,3AE
4Ø57 DATA 7F24B67F24B17F23,34F
4Ø58 DATA 256A7F7F247C7F1C,2C8
4Ø59 DATA B67F1C81ØA255D7F,2DD
4Ø6Ø DATA 7F1C7C7F1BB67F1B,3Ø1
4Ø61 DATA 81Ø6255Ø7F7F1BB6,2CB
4Ø62 DATA 7F1E81ØØ27Ø44AB7,24A
4Ø63 DATA 7F1E7C7F19B67F19,2FF
4Ø64 DATA 81ØA25387F7F197C,27B
4Ø65 DATA 7F18B67F1881Ø625,29Ø
4Ø66 DATA 2B7F7F187C7F1F7C,2D7
4Ø67 DATA 7F16B67F1F811825,2A7
4Ø68 DATA ØE7F7F1F7F7F157F,2BD
4Ø69 DATA 7F167C7F1D2ØØDB6,29Ø
4Ø7Ø DATA 7F1681ØA25Ø67F7F,249
4Ø71 DATA 167C7F15B67F2Ø26,2A1
4Ø72 DATA 31B67F2227Ø37CØ4,232
4Ø73 DATA 1EB67F2127118EØ4,23E
4Ø74 DATA ØØ1Ø8E7FØØA6AØA7,3ØA
4Ø75 DATA 8Ø1Ø8C7F1525F68E,359
4Ø76 DATA Ø4161Ø8E7F15A6AØ,292
4Ø77 DATA 8B3ØA78Ø1Ø8C7F1D,31A
4Ø78 DATA 25F417FED32A1CB6,3FD
4Ø79 DATA FFØ2B6Ø98527114A,2C7
4Ø8Ø DATA B7Ø98526ØBB6Ø986,2BB
4Ø81 DATA 84BØB7Ø986B7FF4Ø,47Ø
4Ø82 DATA 7E89553B,197
```



Listing 4: REMDEMO

```
1Ø CLEAR2ØØ,&H7CFF
2Ø DEFUSRØ=&H7F25'CLOCK PROGRAM
START
25 CLS:PRINT
```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```
26 PRINT"IS REMOTE 3 INSTALLED?"
:LINEINPUTA$:IFLEFT$(A$,1)="Y"TH
EN4Ø
3Ø LINEINPUT"ENTER FILENAME OF R
EMOTE3       PROGRAM. ";FI$:LOAD
M FI$:FORZ=1TO1ØØØ:NEXT:EXEC
4Ø POKE65386,1Ø7:POKE65387,54'SE
T RS232 PAC AT 7-E-1, 3ØØ BAUD
6Ø A=USRØ(Ø)'START CLOCK
7Ø PRINT"ENTER CURRENT TIME AS 2
4 HOUR   MILITARY TIME.":PRINT"E
NTER HOUR ";:LINEINPUTH$:H=VAL(H
$):PRINT"ENTER MINUTES ";:LINEIN
PUTM$:M=VAL(M$)
8Ø '*** CHECK FOR PROPER INPUT *
**
9Ø IFH<Ø OR H>23 OR M<Ø OR M>59
THEN7Ø
1ØØ IF H>9 THENH1=VAL(LEFT$(H$,1
)) ELSEH1=Ø
11Ø H2=VAL(RIGHT$(H$,1))
12Ø IF M>9 THEN M1=VAL(LEFT$(M$,
1)) ELSE M1=Ø
13Ø M2=VAL(RIGHT$(M$,1))
14Ø '*** POKE CURRENT TIME TO CL
OCK ***
15Ø POKE&H7F15,H1:POKE&H7F16,H2:
POKE&H7F18,M1:POKE&H7F19,M2:POKE
&H7F1F,H:POKE&H7F1B,Ø:POKE&H7F1C
,Ø
16Ø INPUT"COCO 3";C$:IFLEFT$(C$,
1)="Y"THENGOSUB1ØØØ
2ØØ MOTORON:POKE65387,54:IFC$="Y
"THENCLS(2) ELSE CLS(Ø)
21Ø K=PEEK(65385) AND 32:IFK=ØTH
EN23Ø
22Ø IF PEEK(&H152)<>255 THENPOKE
B+253,1:MOTOROFF:POKE65387,63:X=
192ØØ:GOTO24Ø ELSE 21Ø
23Ø X=3ØØ
24Ø '**** SOMEONE IS LOGGING ON
****
245 POKE&H7F2Ø,Ø:POKE&H7F21,1'TU
RN ON NAME AND CLOCK DISPLAY
25Ø PRINT"CONNECTED AT"X:FORZ=1T
O8ØØ:NEXT
26Ø IFC$="Y"THEN WIDTH8Ø
3ØØ PRINTCHR$(12):CLS:PRINT"Remo
te 3 demo.":PRINT:PRINT"Who am I
 talking to? ";:LINEINPUTNA$
3Ø2 POKE&H7F1E,1Ø'SET 1Ø MINUTE
TIME LIMIT
3Ø5 '*** POKE NAME INTO CLOCK FO
R CLS AND SCROLL PROTECT ***
31Ø IF LEN(NA$)>21 THEN NA$=LEFT
$(NA$,21) ELSE NA$=NA$+STRING$(2
1-LEN(NA$),32)
32Ø FORZ=1TO LEN(NA$):Z1=ASC(MID
$(NA$,Z,1)):IFZ1>96 THEN Z1=Z1-9
```

```
6 ELSE IFZ1>31 AND Z1<64 THENZ1=
Z1+64
33Ø L=&H7EFF+Z:POKE L,Z1:NEXT
34Ø '*** MAIN MENU ***
35Ø PRINT:PRINT"MAIN MENU":PRINT
:PRINT"[1] Toggle Chat flag":PRI
NT"[2] Toggle Clock display":PRI
NT"[3] Toggle String display":PR
INT"[4] Toggle Inverse":PRINT"[5
] Change Clock speed"
351 PRINT"[6] Log off":PRINT
36Ø GOTO2ØØØ' CHECK TIME LEFT
4ØØ PRINT:PRINT"Enter choice>> "
;:LINEINPUTZ$:Z=VAL(Z$)
41Ø IFZ$="?"THEN35Ø
42Ø IFZ=1 AND PEEK(&H7F22)=Ø THE
N POKE&H7F22,1:PRINT"Chat flag o
n!":GOTO35Ø ELSE IFZ=1 THEN POKE
&H7F22,Ø:PRINT"Chat flag off!":G
OTO35Ø
43Ø IFZ=2 AND PEEK(&H7F2Ø)=Ø THE
NPOKE&H7F2Ø,1:GOSUB21ØØ:PRINT:PR
INT"CLOCK DISPLAY OFF":GOSUB22ØØ
:GOSUB215Ø:GOTO35Ø ELSE IF Z=2 A
ND PEEK(&H7F2Ø)=1THENPOKE&H7F2Ø,
Ø:GOSUB21ØØ:PRINT:PRINT"CLOCK DI
SPLAY ON":GOSUB22ØØ:GOSUB215Ø:GO
TO35Ø
44Ø IFZ=3 AND PEEK(&H7F21)=1THEN
POKE&H7F21,Ø:GOSUB21ØØ:PRINT:PRI
NT"STRING DISPLAY OFF":GOSUB22ØØ
:GOSUB215Ø:GOTO35Ø ELSE IFZ=3THE
NPOKE&H7F21,1:GOSUB21ØØ:PRINT:PR
INT"STRING DISPLAY ON":GOSUB22ØØ
:GOSUB215Ø:GOTO35Ø
45Ø IFZ=4THENGOSUB21ØØ:GOSUB3ØØØ
:GOSUB215Ø:GOTO35Ø
46Ø IFZ=5THENP=PEEK(&H7F23):PRIN
T"Current clock speed"P:PRINT"Th
e larger the number, the slower
the clock.":PRINT"Enter new cloc
k speed ";:LINEINPUTA$:P=VAL(A$)
:POKE&H7F23,P:PRINT"Clock now at
"P:GOTO35Ø
47Ø IFZ=6THENPRINT"BYE!!":MOTORO
FF:FORZ=1TO2ØØØ:NEXT:GOSUB31ØØ:G
OTO2ØØ
5ØØ PRINT"HUH??":GOTO35Ø
1ØØØ '*** SET UP 4Ø AND 8Ø COL S
CREENS IF COCO 3 ***
1Ø1Ø POKE&HEØ3D,PEEK(&HEØ3D) OR
&H2Ø:POKE&HEØ46,PEEK(&HEØ46) OR
&H2Ø:POKE&HF8F4,&H19'THESE POKES
 SET UP SCROLL AND CLS PROTECTED
 AREA ON 4Ø AND 8Ø COL SCREENS
1Ø2Ø WIDTH8Ø:PALETTE8,48:PALETTE
4,Ø:PALETTE1,Ø:CLS2'SET BLACK BA
CKGROUND WITH BUFF LETTERS
1Ø3Ø LOCATEØ,24:ATTRØ,2:PRINT:AT
TRØ,1'CLEAR SCROLL PROTECTED ARE
A ON 8Ø COLUMN SCREEN
1Ø4Ø POKE&H415,96'PUT A SPACE BE
TWEEN STRING AND CLOCK ON 32 COL
 SCREEN
1Ø5Ø WIDTH32:CLS(2):RETURN
2ØØØ ' *** CHECK TIME LEFT ***
2Ø1Ø T=PEEK(&H7F1E):IFT=Ø THENPR
INT"Time limit is up!":GOTO2ØØ
2Ø15 PRINTPEEK(&H7F1D)"day(s) ha
ve elapsed."
2Ø2Ø PRINTT"minutes left":GOTO4Ø
Ø
21ØØ '*** SEE IF COCO 3 ***
211Ø IFC$="Y"THENWIDTH32:RETURN
ELSE RETURN
215Ø IFC$="Y"THENWIDTH8Ø:RETURN
ELSE RETURN
22ØØ LINEINPUT"HIT ENTER TO CONT
INUE";A$:RETURN
3ØØØ PRINT:PRINT"Q TO QUIT OR AN
Y KEY TO TOGGLE"
3Ø1Ø Z$=INKEY$:IFZ$=""THEN3Ø1Ø
3Ø2Ø IFZ$="Q"THENRETURN
3Ø3Ø IF PEEK(&H7FD5)=48THENPOKE&
H7FD5,112 ELSE POKE&H7FD5,48
3Ø4Ø GOTO3Ø1Ø
31ØØ IFC$="Y"THENWIDTH32:CLS(2)
311Ø POKE&H7F2Ø,1:PRINT:RETURN
```


BEST

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Software/Hardware

CoCo 1, 2 & 3

Vocal Freedom — CoCo Claims the First Amendment!

Imagine coming home one day and calling out, "Hello, is anyone home?" as usual. Suddenly, your best friend's voice answers, "Hi, I am speaking to you from inside your Color Computer! I decided to do a little experimenting, and I must have done something wrong, because here I am inside!"

Then you hear your dog barking and your friend telling him to be quiet. You're beginning to be more than a little curious, because it really *does* sound like your friend's and your dog's voice coming from a machine. You go into the next room and see your beloved Color Computer on. Just as you clear the door it says, "I know this is a little hard to believe, but it's really my voice talking to you, and I'm getting kind of hungry, so I want to come out. You better not shut the computer off, or I might disappear forever!"

Well, the barely controlled giggling from the closet indicates that your friend is not *really* in the computer, and Fido's wagging tail reassures you that he's OK, too. But you *have* to know — what is this amazing new device that makes your CoCo sound exactly like your best friend? You don't have long to wait, for soon the numbers on the display stop moving, the screen flashes red and a stranger's voice says, "*Vocal Freedom* is ready!"

Imagine being able to write a program in BASIC and include sound effects like the whine of a jet fighter plane or the plunk of a piano. Or even a person talking and laughing or singing. Imagine the capability for a myriad of sound effects and human voices loaded into memory from file after file and played back at different speeds or in different orders, or all at once. And this is no cheap imitation — this is the real thing; whatever it is that the computer has heard, it will reproduce.

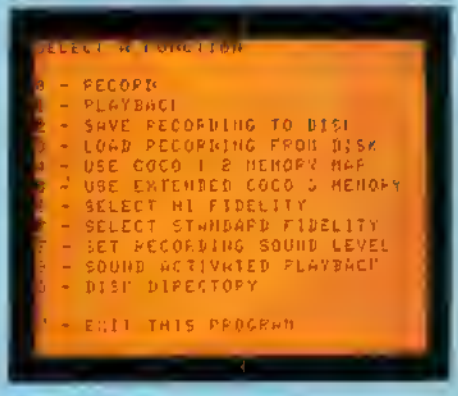
OK, you say, what is this amazing device, this *Vocal Freedom*? It's a software/hardware package from Dr. Preble's Programs that turns the Color Computer into a digital voice recorder (DVR). DVR is the same recording principle used in compact disc players.

Vocal Freedom runs on the CoCo 1, 2 or 3 with at least one disk drive. In

addition to the DVR program, you can also buy a companion program called *Vocal Freedom Hacker's Pac*, which consists of a "programmers toolkit" for special effects used in conjunction with two demonstration programs (one for a 64K CoCo and the other for a 512K CoCo 3).

In addition to the disk and documentation, you also receive a special cable that connects between the right joystick port and an amplifier. Amplifier, you ask? Yes, a small mini speaker/amplifier is required to run *Vocal Freedom*, along with any simple dynamic or electret microphone (like you'd find in a portable tape recorder). The amplifier and microphone are not included in the package, so you'll need to buy them separately. Both are available from Radio Shack. The amplifier (Cat. No. 277-1008), which costs $11.95, is a battery-operated audio amplifier with a built-in speaker.

The microphone can be any one of many different kinds. Radio Shack also sells these, starting at $18. As long as it will plug into the miniature phone jack on the speaker/amplifier, it will work. I recommend the Radio Shack 200-ohm dynamic microphone. It is inexpensive, but effective. If you are going to be getting serious with this product, naturally you are going to want a better amplifier and microphone. And if you have a CoCo 3 or a monitor driver on an older CoCo, you will be able to redirect the sound output to high-quality speakers instead of the TV or monitor speaker.



Vocal Freedom gives you many different options, which are presented in the form of a main menu. The program always returns to the main menu after it has completed a task for you. There are several allowances for using the CoCo 1 and 2 within the framework of this menu structure. One is an option that lets you use the CoCo 1 and 2 memory map. There is also an option that allows the use of the CoCo 3 extended memory map. Basically, the more memory you have, the more recording time you have.

Another option lets you use the high-speed or high-fidelity mode. This is not just a feature for CoCo 3 users, though, as one might expect; many of the older CoCos are capable of the high-speed mode. I tested an older CoCo 2, and it ran in high speed just fine. This feature makes the 6809 CPU chip run at twice normal speed. It is called "high-fidelity" because it allows the computer to sample input at a rate of 8,000 times a second instead of 4,000. This is an important feature, because it makes for a significant difference in quality on playback.

High-fidelity is a must for quality sound reproduction. While Dr. Preble notes in the manual that 4,000 ADC (analog-to-digital conversions) per second is adequate to recognize speech, anyone with the high-fidelity capability in the CoCo would very likely not want to use the low-speed mode. Remember that each sample uses a byte of memory, so memory will get eaten up twice as fast in high-speed mode. This still allows for several contiguous minutes of speech in memory at a time.

Another important thing to remember, however, is that if you fill up 512K of memory with sound and want to save it, you have to have 512K of disk space to put it on! Either that or you must create small files using the CoCo 1 and 2 memory map option. For programmers who might want to include speech or sound in their programs, the 64K files would be a must.

Besides the regular playback mode, there are two other important features of *Vocal Freedom* you should know about. First is the voice-activated playback option. If you select this mode, CoCo will instantly play back anything stored in memory when it hears a noise in the room. (Note the opening lines of this review as an example of this exciting feature.)

The second important feature is the option that lets you set the sound recording level. This option allows users to set the level of their amplifiers for optimum sound recording accuracy. This is accomplished by the computer requesting that you speak into the microphone repeatedly and then adjust the volume control.

After six adjustments or more the computer will inform you that the

What is Digital Voice Recording?

Vocal Freedom and *Hacker's Pac* are more than just run-of-the-mill programs for the CoCo 1, 2 and 3. They comprise a sophisticated software package that includes a digital voice recording program and a set of machine language programs to utilize the power behind the system. What *is* digital voice recording?

Imagine if you will that the computer sees your voice as electrical charges after it is input from an amplified microphone. These charges are sampled or read by the computer either 4,000 times per second in slow mode or more than 8,000 times per second on a high-speed CoCo 3. That's an awful lot of reading to remember! This process has a name — analog-to-digital conversion.

In this process, an actual number value, such as the number of millivolts in a frequency, is converted into a number that the computer understands, a number composed of ones and zeros — a binary number. When data is presented in binary format, the computer can make sense of what it is seeing and hearing.

In order to reproduce what it has seen and heard in a human-understandable format, the computer must take all the numbers it has recorded and convert them back into the actual frequencies they represent, then send them to a speaker like the one in your monitor or TV set.

Dr. Preble suggests in his manual that you think of DVR as a series of snapshots the computer takes and arranges almost like a connect-the-dots picture. The more dots there are, the closer together, the more realistic the "vocal picture" will look when the computer recreates exactly what it has recorded.

This is the same principle at work with compact disc players. CD players sample a sound 40,000 times a second, though, which is 10 times faster than the average CoCo can, and which is why some CD players sound so realistic. They can play back a very accurate reproduction of the frequencies they have heard. □

The Amazing Dr. Preble and his Programs

Like so many other companies in the Color Computer Community, Dr. Preble's Programs has some fascinating and humble roots indeed. The CoCo Community has been supported largely by America's "cottage industry," which is best characterized by hobbyists with entrepreneurial designs inventing something on the dining room table in hot pursuit of what no one else has done before.

Before they know it, there is interest in their breakthrough. Then they create a little company, buy a little advertising in a trade journal, and pretty soon — a star is born. Apple's famous Steve Jobs is a prime example of this. So is Dr. Preble's Programs, and here is that story . . . .

In 1969, there were very few computers around, and most of them filled up large rooms and were owned and operated by the military. Laurence Preble, then an aspiring hobbyist, built for himself a microcomputer from a kit sold by Southwest Tech.

The kit was a 6809-based computer with about 4K of memory, although it was soon upgraded to 24K. Its next upgrade was to 56K, and that is what it has right now — Dr. Preble is still using that computer, having it perform patient functions in his professional chiropractic office. It stores information on 8-inch Qume drives, also from a bygone era, and has a speech synthesizer attached to it.

Dr. Preble's Programs actually began in 1978 when he wrote a program in 6809 machine code and advertised it in the then fledgling *Computer Shopper* magazine. The program was called *Fast Sort*. Shortly thereafter, Dr. Preble became interested in speech synthesis and built his own hardware kit, programming speech phonemes (the actual elements of sound that go together to create speech) into the 6809 computer by hand. Two great and wonderful things occurred next. First, a company called Votrax developed a speech synthesis chip called the SC02, and second, Tandy invented the Color Computer.

Dr. Preble was a hardware hacker through-and-through and could not resist the temptation of this $600-plus machine with its wonderful graphics and exciting sound capabilities. He immediately purchased one and began to work diligently with it. His next hurdle was in 1983 when he wanted to obtain a disk drive; it, too, was in the $600-plus price range.

Instead, he determined to utilize the upper memory bank in his CoCo to work as a fast disk drive by storing programs there in a slightly compressed format. To that end, Dr. Preble wrote a program to utilize the unused areas of the CoCo's memory. The program was called *VDOS*, and it helped to boost Dr. Preble's Programs into the ranks of the dedicated contributors to a rapidly growing CoCo Community.

A veteran RAINBOWfest exhibitor, Dr. Preble continued developing programs for the Color Computer from his well-spring of a truly unique background. One of Dr. Preble's CoCos is now utilizing *Vocal Freedom*'s speech recognition capability and the program *Ears* from Speech Systems (along with a variety of other devices) to run his burglar alarm — and also to open doors, turn on lights and run the intercom system in his house!

As a chiropractor, Dr. Preble studied biofeedback. After completing some work with electrobiometers and galvanic skin response sensing, he took an eclectic approach toward curing patients who were suffering from back pain. He then wrote *Mental Freedom*, a fascinating video game program that reacts to a person's level of stress by using the computer to measure galvanic skin response.

In addition to his private practice as a chiropractor, Dr. Preble is a private pilot and uses his Tandy Model 100 computer for flight planning. He also has the distinct pleasure of having taught our beloved editor and publisher, Lonnie Falk, how to fly.

Dr. Preble said he is very committed to serving the CoCo Community in the months and years to come. He remains fascinated by the impressive and flexible Color Computer and is looking forward to developing ever newer and more innovative software for it. □

sound recording level is correctly set. This is important because if the recording level is set low, the computer will not hear you or will fade in and out and miss words. Conversely, if the volume is set too loud on the amplifier, you can overdrive the recording level and produce very distorted and garbled results. Careful attention to this feature is a necessity!

The documentation that accompanies *Vocal Freedom* is complete and easy to follow. It explains what the computer is doing to turn itself into a digital voice recorder in terms virtually anyone can understand. In fact, this sophisticated program could hardly be any easier to operate. The connections to the amplifier and microphone are very straightforward, and the main menu allows for simple operation. Very shortly after you turn it on for the first time, you will be using it like an expert.

Hacker's Pac

Hacker's Pac is a software package you can purchase as a separate add-on option to *Vocal Freedom*. It is written in machine language utilizing BASIC subroutines. The subroutines themselves are stored on the disk as separate files to make it easy to merge them into your own programs; they are designed to allow the user to load, save, change speed and memory location, and play DVR files created by *Vocal Freedom*.

Hacker's Pac is an excellent tool for extrapolating the uses of *Vocal Freedom* and pushing the product to its utmost capabilities. With this program and its built-in subroutines, recording after recording can be loaded from disk files and stored in memory or switched in and out of memory locations.

One of the best features of *Hacker's Pac* is that it is position code independent, which means that it can be placed anywhere in the computer's memory (as long as it does not interfere with something else already in memory). This is useful when you want to tuck the module out of the way and utilize every last bit of available RAM.

Although a little intimidating at first for the novice programmer, *Hacker's Pac* comes with two demonstration programs by way of an online tutorial. It is extremely easy to use, allowing you to merge *Hacker's Pac* subroutines into programs you write. These demonstration programs really help you learn quickly how to incorporate DVR files into your own programs for spectacular voice and sound effects. If you write programs for commercial applications that utilize *Hacker's Pac*, you must contact Dr. Preble's Programs for a commercial software license agreement.

The documentation that accompanies *Hacker's Pac* is complete and accurate, although a little rigorous for the uninitiated programmer. I recommend the "grabbing the bull by the horns" approach in this case; once you begin to use (and enjoy!) *Hacker's Pac*, you will see how versatile and easy to use it is.

If you are going to purchase or have already bought *Vocal Freedom*, *Hacker's Pac* is a must if you plan to go beyond simple recording and playback

into the sophisticated areas of memory bank switching, speed setting, multiple file loads and saves, etc. As a "programmers toolkit," this software is worth every penny and will stretch *Vocal Freedom* to the maximum.

Hear Ye, Hear Ye!

With *Vocal Freedom* you get an amazingly powerful package with few trouble spots. None of the problems I encountered were either substantial or show-stoppers — with one exception: The documentation does not specify filename format when the machine prompts you for loading or saving files.

The version I used worked when the filename was typed without quotes and without its .DVR extension, in most cases. However, unless I answered with a correct filename at this load or save prompt, the program would crash and have to be restarted. Also, there is no warning when you run out of disk space — you just get tossed back to the main screen with the fate of your file in limbo. Here also the documentation assumes that nothing will go wrong. If something *does* go wrong that you cannot handle on your own, you can call Dr. Preble's Programs for assistance. There is a 24-hour hotline.

Vocal Freedom and *Hacker's Pac*, while being a little expensive when you add in the cost of the amplifier and microphone, are well worth the investment. This is a real, working digital voice recording system that could have numerous applications from interactive education to entertainment to working with blind people who want to learn about computers. Its potential for special effects makes this an excellent value and an important volume in the CoCo software library.

Vocal Freedom is a full-featured and sophisticated program made even more powerful by its companion, *Hacker's Pac*. In spite of a few minor problems, the programs are really quite versatile and well-programmed. I can recommend this package to anyone without hesitation. If the idea of digital voice and sound recording intrigues you, *Vocal Freedom* could be the program you've been waiting for!

(Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228, 502-969-1818; *Vocal Freedom*, $34.95; *Hacker's Pac*, $14.95; add $2.50 S/H)

— Jeffrey S. Parker

Software CoCo 1, 2 & 3

BASIC Utility Diskette — Utilities for the BASIC Programmer

The *BASIC Utility Diskette* from T.E.M. of California is a collection of five programs to assist the software developer in writing and debugging BASIC programs. The disk also includes a compiled version of two of the programs to increase the processing speed for large files. The utilities require a CoCo 1, 2 or 3 with at least 64K, one disk drive and a printer.

The five utilities consist of the following programs: COMPARE_BAS, CROSSREF.BAS, DUMPCRT.BAS, DUMPDIR_BAS and DUMPFILE_BAS. Patches are provided for each of the programs, so you may customize them for your particular hardware. This allows you to bypass the initial questions about which CoCo you are using and how many drives you may have.

The first utility, COMPARE_BAS, comes with a compiled version, which is loaded by a BASIC program called COMP.BAS. Both perform a line-by-line comparison of two BASIC programs, which may be saved in either ASCII or binary format as long as both files are in the same format. The lines that differ will be output to the printer (you can elect to have the entire line printed or just the line numbers).

The compiled version requires that you leave the disk in the drive, because it loads program code as required. Single-drive users are required to copy the utility programs onto the same disk as the programs being compared. This utility makes it very simple to locate minor changes between program versions. The manual includes instructions for handling versions with line numbering offset by the RENUM command.

The CROSSREF.BAS utility can be used only on BASIC programs saved in binary format. This utility provides a numerical listing of all jump instructions (i.e., GOTO, GOSUB, etc.) in a program. It requires the use of temporary storage space on your disk; therefore, there must be space available and no write-protect tab. The space is released upon normal completion of the program. Halting the program during execution will *not release* the disk space used: You must run the program again and allow it to complete normally to release the space. The output produced is a listing of line numbers called and from where they are called.

The DUMPCRT.BAS utility includes three versions. One is for standard 32-by-16 text displays, one is for 40-by-24, and the other is for 80-by-24. Of course, the last two are only for the CoCo 3. According to the instructions, the primary use of this program would be to print the screen display of the TRON (trace on) command. DUMPCRT may be executed directly from the keyboard or embedded within the program being traced using the TROFF (trace off) and RUN commands. Small sections of code may be traced and debugged in this manner. You must select the proper locations to embed the DUMPCRT command so your trace will not scroll off the screen before being printed.

The DUMPDIR.BAS program is mainly to assist in keeping track of the programs on your disks. It produces a printed listing of the files on a disk that may be trimmed to fit into a disk jacket for reference. The information includes a disk name and date, filename, extension, type, indication of binary or ASCII format, number of granules, number of sectors, and amount of free space remaining — a very handy program, indeed.

The last utility is DUMPFILE.BAS. This utility may be used with programs written in BASIC and saved in either ASCII or binary format, as well as with machine language programs. A printed copy of the disk file is produced in either decimal or hexadecimal form. The number of sectors in the file is determined, and you may dump any range of sectors. The listing contains 20 bytes per line and 256 bytes per sector.

Two of the demo programs provided on the disk are also useful utilities. One produces a sorted directory listing on the screen, and the other converts either a decimal or a hexadecimal number to binary.

All of the programs worked flawlessly and were accompanied by a 32-page manual. I tested several different BASIC programs and one machine language program as well as the demos provided. The CROSSREF program even found a syntax error (an extra quote mark) in something I had typed. Programmers who do much work in BASIC

would do well to include the *BASIC Utility Diskette* in their utility library.

(T.E.M. of California, Box 4311, Fullerton, CA 92634, 714-871-8210; $19.95 plus $2 S/H)

— Larry Birkenfeld

Software CoCo 3

Castle of Tharoggad — To Slay an Evil Wizard

The good wizard who ruled the kingdom of Tharoggad has been abducted and imprisoned by his evil brother. You, the superhero of the land, must go into the castle and rescue him. But beware: There are traps to avoid and giant spiders, snakes, ghosts and bats that you must do battle with, using weapons found along the way.

Castle of Tharoggad is a maze Adventure game supplied on a ROM pack for the CoCo 3. The game has seven levels, and you start out on the ground floor carrying nothing but a backpack that contains a torch. You will need a joystick or mouse and either a TV or RGB monitor. The package includes an 11-page booklet that provides adequate instruction on game play.

Castle of Tharoggad is icon- and menu-driven. The lower half of the game screen consists of the icons, which represent your options. In the center of the collection of icons is a beating heart — yours. The speed with which the heart beats is determined by how much you exert yourself moving around and battling creatures. The slower the heart beats, the healthier you are and the more likely you will defeat the creatures. On the other hand, the faster it beats the more likely you will lose the battle.

Just above the heart is a compass you point and click to move around the maze. There is also a game save icon — this feature is a must! The game save consists of four codes of nine letters and numbers. Other icons include left and right hands, a backpack in which to store inventory, "grab" and "drop" icons, an "incant" icon, and "trap door" icons to reach the levels above and below.

To pick up an object, you point to either the left or right hand and then to "grab." To pull something out of the backpack, you point to the backpack and then to a hand. To attack one of the verminous creatures that never leave you alone, you double-click on either the left or right hand icon. Castle inhabitants will also pick up objects — sometimes objects that you'll need later in the game. However, when you kill a creature it drops whatever it's carrying.

The graphics occupy the upper half of the screen — the maze with the creatures, weapons and traps. You'll see all this, that is, after you figure out how to make your torch work. The graphics, though animated, are not what you would expect from a CoCo 3 game. In fact, I have seen better graphics on CoCo 2 games. It's hard to feel heroic when you're slaying a blue spider that wears a silly grin on its face.

Also, the joystick response sometimes becomes very sluggish during battle, which can be frustrating. To be honest, the whole game is a little slow.

Until you collect a certain number of objects, which involves killing a number of creatures, you cannot find the doorway to the next level. At times the creatures would attack in twos or threes, regardless of whether I stayed still or moved around. Other times I could find no creatures, weapons or door to the next level for long periods of time.

I feel that if *Castle of Tharoggad* had better graphics and more action it would be more appealing. But if you're a video Adventurer who is persistent and does not mind if a game is a tad slow, *Castle of Tharoggad* could be a game for you.

(Tandy Corporation, Fort Worth, TX; $29.95; Available in Radio Shack stores nationwide)

— Steve Griffith

Software 512K & OS-9 Level II

OS-9 Level II BBS — Put Your Own Board Online

One of the most entertaining aspects of the computer hobby is telecommunications. Many of us use our CoCos to communicate with Delphi and CompuServe as well as with friends both near and far. As you sit at the keyboard browsing through the myriad of databases on these systems, you might think it would be neat to operate such a system yourself, admittedly on a much-reduced scale.

There are programs in the Disk BASIC world that let you start and operate a BBS. *CoBBS* (THE RAINBOW, November 1985, Page 135) is one of them. Now those of us in the OS-9 realm have the same opportunities with the introduction of *OS-9 Level II BBS*.

OS-9 Level II BBS is not a single, large bulletin board program — in the spirit of OS-9, it is a set of utilities and commands used to create and run the board. In addition to the software, you will need an auto-answer modem and 512K of memory.

Rather than discuss all the components, I think the following will best illustrate the package:

Command	Function
tsmon	autobaud terminal monitor
login	user log-in manager
monitor	carrier-detect monitor
menu	menu manager
BBS.build	simple file creator
BBS.chat	chat with SysOp
Answer	answers request to talk with SysOp
BBS.create	creates message base
BBS.post	posts a message to the board
BBS.delete	deletes a message
BBS.pack	packs messages after deletion (conserves disk space)
BBS.read	reads messages
BBS.forward	reads forward beginning with a specified message number

BBS.new	reads all new messages since last access
BBS.scan	lists headers of all messages in the message base
BBS.search	keyword search of message
BBS.mail.post	posts mail
BBS.mail.check	checks to see if previously sent mail has been received
BBS.mail.read	reads mail
BBS.mail.readd	deletes mail
BBS.upload	provides capability to upload files to the BBS using either standard Xmodem, CRC Xmodem and Ymodem
BBS.download	provides the same transfer options to download files
BBS.conf	enters conference with another user
BBS.conf.who	informs user who is on the system

As you can see, all the basics of a bulletin board are present, including the standard functions for operating the usual message databases as well as three protocols for uploading and downloading files and programs. Not mentioned in this list are SysOp utilities and utilities for maintaining the download section of the board. The program provides a command that allows the SysOp to validate uploads and add a one-line description, a list of keywords and a paragraph description. This information is available to users wishing to download a file.

The *OS-9 Level II BBS* package also comes with the utilities TSMon, Login, Monitor and a menu program. TSMon is the time-share monitor, which is similar to TSMon provided by Tandy in its Development Package. This is an autoband version in that it adjusts to the standard baud rates between 300 and 2400. Once TSMon opens communication, it runs Login and Monitor. Monitor simply monitors the carrier detect signal from the modem. When this signal is lost, Monitor kills all processes started by the user so that a new user can log in. Login provides just what you would expect — it requests the user's ID and password and then validates the user and runs the menu program. This is the standard and usual way of running the board; however, the SysOp can choose to give a particular user access to the shell.

"Installing the bulletin board is quite easy since an installation shell script comes with the package."

The menu program is quite useful in its own right, providing a way to add new options to the BBS. Two files are read by the menu command. The first file is the menu itself. The second file is the command file, which is a list of single-letter options and the command

★ ★ ★ NEW ★ ★ ★

BASH by Steve Bjork
Based on a popular arcade game which we can't mention (But sounds like 'Art Gannoyed"). BASH challenges you to clear the screen by "BASHING" your ball through multiple brick layers. Of course you'll have help getting through this 20 level game by activating options like, Slow Ball, Expanded Paddle, Multi-Ball and more!
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WARP FIGHTER 3-D by Steve Bjork
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to be executed for that option. The following should illustrate how Menu operates.

Menu File	Command File
L List files	L Dirdownloads
U Upload file	U Uloadx
D Download file	D Dloadx
M Main menu	M Chd /dd/BBS

All OS-9 commands and special characters are valid on the command lines of the file. The neat thing about the Menu command is that a change directory command will cause Menu to read the menu and command files in the new directory. This is accomplished by using the same filenames for these files in each directory, e.g., bbs.menu and bbs.cmds. These files are text files and can be created by your favorite editor.

Installing the bulletin board is quite easy since an installation shell script comes with the package; this consists of two disks that contain the various programs and a complete BBS ready to run. In other words, all of the menu and command files have been set up. Install creates all the necessary directories and copies the menus and files. This is very useful for those with hard disks or floppy drives other than the standard single-sided 35-track drive, which the software comes on.

A very nice feature of *OS-9 Level II BBS* is an option in the TSMon command that allows you to run the BBS in a window for debugging. It's really neat to have the board running in Window 1, *DynaStar* in Window 2 and utilities in Window 3 as you begin the process of customizing the board. In this way you can make changes and see the immediate result by flipping to the BBS window.

Although the primary purpose of the *OS-9 Level II BBS* is to run a bulletin board system, there are several other uses for the software. As I noted above, the board will run in a window — it could be set up as a family message center.

If you transfer public domain programs with others, you can eliminate the need for two people to have to set up terminal programs. Rather, set up the BBS — at least one person is free to go on and do other things with the CoCo. As you would expect for a multitasking system, you can perform other tasks while the BBS is running — even on a floppy system. *OS-9 Level II BBS* was tested on a floppy disk-based system and performed just fine. Obviously, a hard disk will greatly improve system performance.

The Menu program, which actually controls the BBS, is a very useful program in other ways. It can be used (especially on a hard disk) to better manage the use of the computer, i.e., make OS-9 more user-friendly by setting up menus and command files in each directory and letting Menu control the movement about the system.

Although I don't have the time to run and maintain a BBS, *OS-9 Level II BBS* is an excellent package for those who do. It is nicely done, especially with the operational BBS included. The ability to customize the BBS to your own liking is an added feature. And the additional use of some of the utilities beyond the BBS make this package especially attractive.

One precaution independent of the software is to make sure that the cable between computer and modem carries the DTR and carrier-detect lines. These lines are necessary and are sometimes not connected in some cables (I learned about this the hard way!).

(Alpha Software Technologies, 2810 Buffon St., Chatmette, LA 70043, 504-279-1653; $19.95.)

— Donald Dollberg

Star Micronics

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DELPHI: The Official Guide — Off-Line Help for Online Operations

Like the intrepid native guides that lead expeditions up the Amazon, *DELPHI: The Official Guide* will lead you through the vast jungle of information offered on the Delphi computer information network. If you, like me, find the service easy to use, but the quantity of information offered bewildering, then this book is for you.

Even though Delphi has a very complete online help library, the ultimate help utility is this book. Written with the new user in mind, *The Guide* will be of benefit to most Delphi subscribers — especially when trying something for the first time.

> ***"The reader is guided through virtually every menu the service offers and is provided detailed explanations of what each choice from every menu will yield."***

The book begins with a section called "Getting Started." In simple language, using a minimum of jargon, the section gives you instructions on how to set up your terminal software to communicate with Delphi, how to sign up on Delphi, and how to tell either Tymnet, Telenet or Datapac that you want to be connected to Delphi. From there you go into a discussion of important commands and how to answer questions in a way that the service understands.

The next few chapters are filled with descriptions of services and options available. Did you know that Delphi has a mortgage calculator online? That's just one of the services you can find out about in the book. I doubt most users would ever discover all the neat things on Delphi by themselves. With *The Guide*, it's all laid out in black-and-white for you to study off-line.

The reader is guided through virtually every menu the service offers and is provided detailed explanations of what each choice from every menu will yield. This alone justifies the price of the book. I have spent a great deal of time online searching through the various menus, looking for a particular service I'd seen somewhere but was unable to find again. Now I just look it up in *The Guide*'s index, and there I am — without having to press CTRL-Z even once.

The chapter covering online Workspace proved to be the most helpful to me. Workspace is a versatile feature with a very cryptic way of operating (at least to me). After reading *The Guide* I still find the Workspace to be cryptic, but now I can get around in it and do some tricks I had not even suspected were possible. *The Guide* gives concise instructions and clear examples on how to do most anything you can think of with the files in your Workspace.

The Guide contains more than 480 pages with almost 100 pages of references, indexes and appendices. There is also a three-page, front-and-back pullout that lists all the commands and menu options.

DELPHI: The Official Guide seems to be as complete a reference as you will ever need. If you use Delphi often, *The Guide* will eventually pay for itself — you'll save on the connect fee usually spent reading through help screens. You can look up any information you need — off-line. Besides, reading *DELPHI: The Official Guide* will give you something to do while waiting for the evening hours when you can afford to get online.

(Simon & Schuster, 1 Gulf+Western Plaza, New York, NY 10023, 212-373-8142; $21.95)

— David Horrar

Video Draw Poker — Five-Card Simulation

Aeeording to its author, *Video Draw Poker* was developed to simulate the video poker maehines found in easinos. (Depending on where you live, they may also he found in loeal elubs and bars.)

Usually for a minimum of a quarter, the machine deals you five eards. After the deal you may replaee some or all of the cards. If your new poker hand then meets the requirements for one of the payoffs, you are either paid off or credited with additional plays.

Unlike real slot maehines, winning and losing is not totally a random event — your choice of which cards you keep and which you discard does affeet your likelihood of winning. (Unfortunately, however, even if you make the best possible move, the odds, like the odds on slot maehines, are still staeked against you.)

Video Draw Poker works on two levels — you ean play the game for nothing and, perhaps more importantly, you ean test various playing strategies.

The simulation comes on tape or disk and requires a minimum of 32K. I testcd the disk version. From a simple menu, your choiees are playing, testing or quitting. If you choose to play, you will be asked how much money you want to start with. Once you are staked, you can bet from $1 to $5 on a hand as long as you have money.

Once you have made your bet, five eards are dealt. (The graphics are relatively simple — the purpose of this simple program is not to dazzle your friends.) You then choose your discards and the computer replaces them. If your hand meets a payoff level, your winnings are added to your stake. Play continues until you either run out of money, quit or deeide to test a playing strategy.

I found the strategy-testing part of this simulation to be its most interesting and valuable feature. The program allows you to set up a hand — you deeide which five cards you initially receive, which you will discard, what your initial stake is and how much each hand is worth.

When the simulation is set up, the computer will then randomly play this same hand as many times as you want it to — all the while keeping a running total of your stake. For example, suppose that you are dealt a four, five, seven, eight (eaeh of different suits) and an aee of diamonds. Do you throw away the aee and hope to draw a six (eompleting your "inside straight") or do you diseard everything but the aee, figuring that drawing four eards will give you more possible ways of winning?

"What should I do if three of the cards, including the ace, are diamonds? If four of them are diamonds? With this simulation, I can find the best strategy."

Figuring the odds of drawing the straight are fairly easy — there are four sixes in the remaining 47 cards. Therefore, I have four chanees in 47 of drawing a straight that will give me baek $4 for my dollar wagered. (Note that a six is the only card that will win for me.)

The second possibility is not as easy to figure. With four eards, I eould match my aee, pair other eards, get a straight, flush, full house, or even a royal flush. The possibilities are measurable but not nearly as easy to figure.

Which is the better play? I could consult my old statisties textbook or I could allow the eomputer to play each hand perhaps 5,000 times. The answer would most likely be the same. The beauty of this simulation is that it allows us to check various strategies. What should I do if three of the cards, including the ace, are diamonds? If four of them are diamonds? With this simulation, I can find the best strategy.

In his easy-to-understand documentation, the author lists four uses for his program: fun, testing strategies, practiee, and deciding "if you want to do real gambling on this type of machine." Interestingly, the eonclusion for the final use eomes after you've done the other three. The program is fun, and it allows you to praetice all kinds of strategies. But it still wins even when you use the best of strategies. If you are interested in video poker, you should check into this program.

(Prometheus Software, P.O. Box 15859, Long Beach, CA 90815; $17)

— John Matviko

V-Term — CoCo 3 Terminal Emulation

Whether you are going online for the first time or just looking for a terminal program that is a little more versatile than the one you are presently using, I don't think your search will be over until you have purehased a copy of *V-Term*. This is probably one of the most versatile and full-featured terminal emulators I have seen for the CoCo 3.

One of the first things I noticed upon opening the paekage was the well-written and professional-looking manual, which contains 56 pages of information that will have you online in no time. It even ineludes a seetion ealled "An Introduction to Data Communications," whieh should help even the noviee to understand exaetly how modems and terminal programs work together to allow communication with other systems.

I feel I should mention the quality of the manual beeause, in my opinion, even the best program is worthless if it is not supported by the proper doeumentation. Believe me, *V-Term*'s manual leaves few questions unanswered.

Another thing I am happy to report is that *V-Term* is supplied on an unprotected disk, so you can make a backup.

When I loaded *V-Term*, it autoexecuted and I was greeted with the start-up screen. It was a 28-line screen of which the bottom three lines were reserved for the onscreen menu. Using the ALT and arrow keys I was able to select from the menu options, which usually presented me with a submenu.

The first choice I made was to select the option Parameter from the main menu. From here I was able to change the RS-232 rate, the transfer protocol I wanted for uploading/downloading files, printer settings, and even screen color. I was able to save these and other options to disk — every time I boot *V-Term* it's configured exactly the way I like it. Still not impressed?

Another option from the Parameter menu is Terminal, which allows you to choose from the four types of terminals *V-Term* can emulate: VT-100, VT-52, Vidtex and CRT. If you subscribe to CompuServe, something you may find of special interest is that *V-Term*'s

If you are working on a BASIC program that has you stumped, write in to Bill for a fix. He can help solve your programming problems.

Merging Subroutines

Dear Bill:

I've been computing for only about seven months, and this month I finally upgraded to a disk system. I've written several programs that use the same subroutine. Up until now when I wanted to start a new program, I deleted all the lines from the previous program except those of the subroutine I want to re-use. What do I do, short of re-entering those lines, if I've already started a program and decide I'd like my old subroutine added? Any help you can offer will be greatly appreciated.

Todd Barkley
Orange, CT

That particular question was one I asked a few years ago myself. I've since gotten some extended use out of the procedure I'm about to explain. It's called MERGE, and it is really quite handy.

There are only a few things you have to remember when using the MERGE command. First, the program or portion of a program you'd like to add to the main program must first be saved in ASCII format. To do this, simply isolate your routine, deleting all line numbers you won't be using. What's left we'll call SUBX (SUBroutine X). We'll call the main program MAIN; it will be numbered starting with Line 10 and continuing through Line 300.

Personally, I like to renumber my subroutines before I save and merge them, but you don't have to. However, just humor me for now and do it this way. Later on, when you become familiar with the procedure, you can take all sorts of liberties.

All right, so now you have SUBX and nothing else in memory. Type RENUM 1000,10,10 and press ENTER. To see the results, type LIST. You'll notice that SUBX now starts at Line 1000 and continues listing in increments of 10. You can renumber starting with any number you like, as long as it's higher than the last line number of the program to which you want to merge it — at least for this example. Now that you have your renumbered SUBX in memory, save it in ASCII by typing SAVE "SUBX",A and pressing ENTER. Now if you type DIR and press ENTER, you'll see that your subroutine is saved on disk. Make sure that this ASCII-saved subroutine and the main program are both on the same disk.

Once both of these files are on the disk, type LOAD"MAIN" and press ENTER. At this point MAIN is now in memory and SUBX is only on the disk. Once you've loaded MAIN, type MERGE "SUBX" and press ENTER once again. You'll hear the disk drive churning. When it stops and the OK prompt appears, your two files will be merged into one. To make sure, type LIST, press ENTER and you'll see the program scroll by. You can halt the scrolling any time by pressing SHIFT and @ simultaneously.

You'll notice, as MAIN scrolls by, that when it gets to Line 300, the next line is 1000. This is where SUBX picks up. Now you're free to continue adding more lines to the main program between lines 300 and 1000. When you need to access your subroutine, add a line that says GOSUB 1000.

Now the two merged files are in memory, but you'll have to re-save them to disk again. Call the product of the merger MERGPROG, for example, type SAVE"MERGPROG" and press ENTER. That's about all there is to it. It'll save you a lot of extra typing and time.

By Bill Bernico
Rainbow Contributing Editor

DATA Dilemma

Dear Bill:

How does one understand and write DATA statements as part of a BASIC, pseudo machine language, program? I can understand the basic concept of a line like

```
READ A:FOR I=&Hxxxx to &Hxxxx
:POKE I,A:NEXT I
```

but from there on, my comprehension fails me. What are the numbers in the DATA statements? What do they stand for, and most of all, how do we (the programmers) know where to get them and how to put them in the proper order?

I would really appreciate being enlightened because some programs are written entirely in DATA statements. Thanks for your help.

Bernice Shoobs
Clifton, NJ

It's funny that you'd ask me this question, Bernice. I wondered about it myself for a long time and finally asked someone more familiar with the procedure than myself about it.

I learned that the program is first written in assembly language using an editor/assembler. When the process is complete, you have a *binary* file. Since, on a scale of one to 100, my knowledge of ML programming is about .00001, I can't help you with the procedure of assembling the code.

However, from what I understand, once you have that binary file, you can convert it to BASIC by using a short program that changes the binary code to DATA statements. Kevin Davidson's utility, *MacData*, [RAINBOW, "The Demystification of ML On Disk," December '83, Page 181] would accomplish this task. I've tried the program and have converted several binary files to BASIC programs. These programs go a little slowly, but they work fine.

From Text to Graphics

Dear Bill:

I'd like to convert some of my favorite BASIC text programs to the graphics screen. Without doing a lot of guessing, is there a way to figure out where to draw so that the text will appear in about the same position on the graphics

---

Bill Bernico, RAINBOW's newest columnist, is the author of more than 300 Color Computer programs. He founded Bill Bernico Software in 1987 and enjoys writing and recording his own music.

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

The Answer, a program that allows you to communicate with your "inner self" via subliminal messages. For the CoCo 3. *Alpha-Biorhythmics, Inc., P.O. Box 2203, Richmond, IN 47375, (317) 962-6644; $29.95.*

Armchair Admiral, a Battleship-type game for up to eight players that places you at the helm of four ships – a sloop, caravel, brigantine and galleon. "Your orders are to stay afloat while trying to sink your enemy, who is in command of identical ships." For the CoCo 3. *Evergraft, P.O. Box 3354, Arlington, WA 98223, (206) 653-5263; $14.95 plus $2 S/H.*

Bash!, a one- or two-player machine language arcade game, similar to *Breakout*, that has players ping-ponging and blasting away "bricks" (the scenario involves construction). There are 20 screens of debris that must be cleared away. If you catch the special falling bricks, you will be rewarded with points. For the CoCo 3 and disk drive. Program written by SRB Software but available exclusively through Game Point Software. *Game Point Software, P.O. Box 6907, Burbank, CA 91510, (818) 566-3571; $24.95 plus $3 S/H introductory offer, regularly $29.95 plus $3 S/H (demo disk, $4.95).*

Deluxe Icon Editor, an AIF icon editor running under OS-9 Level II in the *Multi-Vue* environment on 512K CoCo 3s. Documentation is included on the disk. A mouse and a high resolution interface are recommended, but not required. Requires 512K CoCo 3, OS-9 Level II and *Multi-Vue*. *Puritan Springs Software, Ameritrust Building, 17140 Lorain Ave., Cleveland, OH 44111, (216) 251-8085; $10.95.*

Horse Sense, a horse race handicapping program that breaks the race down into three sections – call, second call and wire. The speed of the horse is computed in feet second for each of these sections. For the CoCo 1, 2 and 3. *Western Hills Software, 6133 Glenway Ave., Cincinnati, OH 45211, (513) 662-3233; $24.95.*

The KJV on Disk: Mark, the Bible's book of Mark on disk in ASCII files for importation into a CoCo 1, 2 or 3 word processor. *BDS Software, P.O. Box 485, Glenview, IL 60025, (312) 998-1656; $3.*

MacPlay, a program that allows you to play Macintosh digitized sound files, which can be downloaded from CompuServe or Delphi. For the CoCo 3. *CoCoTech, Inc., 208 Cathy Ann Drive, Reading, PA 19606, (215) 779-7768; $19.95.*

Mine Rescue, an action ML game for one or two players. Your mission is to rescue trapped miners whose air is rapidly running out. You can pick up extra points on the way by gathering gold and gems while avoiding falling icicles and the banshee. Carrying tanks of fresh air, you will climb rocks and ladders and leap pitfalls. The game was written by SRB Software but is available solely through Game Point. Requires CoCo 3, disk drive, joystick and color/RGB monitor. *Game Point Software, P.O. Box 6907, Burbank, CA 91510, (818) 566-3571; $24.95 plus $3 S/H introductory offer, regularly $29.95 plus $3 S/H (demo disk, $4.95).*

R.S.B., an adaptation of Disk Extended Color BASIC for OS-9 Level II. The command syntax is identical, and BASIC programs may be run in several windows simultaneously. Commands are accepted in both upper- and lowercase, and all I/O uses OS-9 system calls. For the CoCo 3 and OS-9 Level II; compatible with *Multi-Vue*. *Burke & Burke, P.O. Box 1283, Palatine, IL 60078, (312) 397-2898; $39.95.*

Scenery Disk #7, a scenery disk for *Flight Simulator II* that covers the eastern seaboard from Washington D.C. down to Miami. It includes the major airports, radio-nav. aids, cities, highways, rivers and lakes. A map is provided. For the CoCo 3, requires *Flight Simulator II*. *subLOGIC Corporation, Champaign, IL; available through subLOGIC's order line: (800) 637-4983; $24.95.*

Security Projects for the TRS-80 Color Computer, a book of hardware projects including a "vacation light," a temperature alarm, a sound-activated alarm and an intrusion alarm. *Brown's Enterprises, 119 Skyline Drive, RR. Granbury, TX 76048, (817) 573-0037; $7.50.*

Tax Estimator, a tax program, placed in the public domain, that helps users estimate their federal income tax liability in preparation of forms 1040, 2106 and 2441. It may be obtained for a $5 shipping and handling fee. For the CoCo 1, 2 and 3. *Try-O-Byte, 1008 Alton Circle, Florence, SC 29501, (803) 662-9500; $5.*

TypeMate, a menu-driven typing tutor that draws the CoCo keyboard onscreen; whenever a key is pressed, the screen's keyboard echoes it. The program instructs beginners in correct finger placement, charts a course of study, and provides typing exercises and the capability for users to create their own lessons. Requires a CoCo 1 with 32K, a CoCo 2 with 64K or a CoCo 3. Supports cassette recorders and a printer. *Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX; Available in Radio Shack stores nationwide.*

Warp Fighter 3-D, a one-player, joystick-controlled 3-D space fighter Simulation in which you must shoot down the Akaira enemy from 25 sectors of space. To move quickly from one sector to another, your ship is equipped with the Federation's new warp drive. 3-D glasses are supplied (for $2.95). For the CoCo 3 and disk drive. Program written by SRB but available exclusively through Game Point Software. *Game Point Software, P.O. Box 6907, Burbank, CA 91510, (818) 566-3571; $24.95 plus $3 S/H introductory offer, regularly $29.95 plus $3 S/H (demo disk—without 3-D glasses—$4.95).*

Western European Tour Scenery Disk, a scenery disk for *Flight Simulator II* that covers southern West Germany, northern France and southern United Kingdom. It includes the major airports, cities, highways, rivers and lakes, and includes a map. For the CoCo 3 and *Flight Simulator II*. *subLOGIC Corporation, Champaign, IL; available through subLOGIC's order line: (800) 637-4983; $24.95.*

ZoomDump, an update to the PMODE 3 or 4 graphics screen dump for the DMP-105 and DMP-106. New features include horizontal paper positioning and the ability to print any rectangular section of the screen, along with upright or sideways images. For the CoCo 1, 2 and 3. *Colin Enterprises, 2301-C Central Drive, Suite 684, Bedford, TX 76021, (817) 283-8571; $14.*

First product received from this company

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Lauren Willoughby

have edited at least one module. When you create a bootable disk for the first time using OS9Gen or Config, you are combining a number of modules into a program called OS9Boot. While Config is perfectly capable of creating OS9Boot, it is time-consuming at best.

EZGen comes into play when you want to alter, add to or delete from an existing program that consists of a set of modules. Using only the programs available with OS-9, these tasks are quite tedious. For example, when I bring my system to school with me I use a single drive instead of the two drives I use at home. I have been putting off deleting the d1 device descriptor module in the OS9Boot program for my school disk because it would take too long to generate a new OS9Boot using Config.

As a working test of *EZGen*, I removed d1 from OS9Boot in about 10 minutes, which included reading the manual. Patching the existing device descriptor for a 12-millisecond step rate was also a quick and painless job. Finally, I added the two RAM disk modules to OS9Boot. All of this was done with *EZGen* alone.

EZGen has several other capabilities that some people may find handy. It allows you to rename a module, patch a module using either Burke & Burke's Patch format or the Disk BASIC binary format, save a module to disk, extend a module and add a module header.

The last two abilities are quite interesting and powerful for the hard-core types like me who like to do things in unusual ways. For example, using a file transfer program I can move a machine language program from the Disk BASIC environment into OS-9. Then, using *EZGen*, I can add a module header so that the program can be loaded by OS-9. Once it's loaded, I can use one of the powerful OS-9 disassemblers on the program. Being able to extend a module easily can allow you to add a small subroutine to an existing module without having to disassemble the whole thing first. I did that once and it was very tricky. With *EZGen* it could be a snap.

There are a few things I wish *EZGen* could do, or at least could do better. First is an ability to locate modules and data blocks within programs. You must know the names of the modules you'll be working on in order to tell *EZGen* which module name to find. This problem isn't insurmountable; you can get module names with Ident before you start (or by forking a shell from within *EZGen*), but it would be easier if there were some way to call a list of module names from within *EZGen*.

Another wish is related to a problem I had with user mistakes. Any user mistake causes *EZGen* to quit and return to OS-9 unless the command is preceded by a hyphen. I have a nasty habit of pressing ENTER a couple of times when I'm working in this type of program just to be sure it's awake and operating. Every time I do this, *EZGen* quits and I have to start it again. This isn't a flaw or a bug, just a way of doing things that takes time to get used to.

Another problem I had was with disk space. Because *EZGen* has to create at least one copy of the module you are editing, you need sufficient disk space to use it. I suggest that any program with *EZGen*'s power should be used on a backup. And because of the disk space problem, I recommend placing the backup on a nearly empty disk — especially if the module you are working on is large.

I also have some problems with the manual. The style is that of standard UNIX "man" entries. This is OK for experienced users who know exactly what they want to do, but it can be intimidating to new or occasional users who aren't familiar with the terse style. The manual could also use more examples and a better explanation of what *EZGen* can be used for. With some experimentation, most OS-9 programmers who have a use for *EZGen* will be able to figure it out, so I guess the manual isn't a big handicap. I just think that it could be expanded some.

Included with *EZGen* are two other programs that work as a team or individually for very specific tasks. *TagTrack* corrupts the OS-9 file system in a controlled way that lets you determine which files reside at least in part on a particular track. Using *TagTrack* you can locate, edit or delete the OS-9 kernel, or you can find the files that need to be deleted to clear a particular track for some reason (creating a disk readable by OS-9 as well as Disk BASIC, for example).

Zap can undo the corruption caused by *TagTrack*. It does this by releasing the directory entry and file descriptor sector for a file without releasing the sectors in use. It can be used to make a sector or group of sectors unusable by OS-9. These things can be done using a patch program or disk editor, but they are very tedious that way. Burke & Burke has given us a way to perform several difficult tasks quickly and easily.

If you've ever done any of the jobs that *EZGen* can do, you already know how much you need this package. If you don't see a reason why anyone would want to do what I described, then maybe you should wait until you need it. Just remember to get *EZGen* before you start — it'll save you an awful lot of work.

(Burke & Burke, P.O. Box 1283, Palatine, IL 60078, 312-397-2898; $19.95 plus $1.50 S/H)

— Donald McGarry

Corrections

"Received and Certified" (October 1988, Page 130): The *Hard Bodies* program was incorrectly listed as the first review product from Baron Products for review in THE RAINBOW. An earlier Baron Products program, *Track Events*, was reviewed in the February 1986 issue (Page 200).

"Quick Fixes" (October 1988, Page 58): An IC pin is incorrectly labelled in the schematic shown in Figure 2 (Page 62) of the article. On the right-hand side of the figure, the designation IC4 Pin 3 should be changed to IC4 Pin 5.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

Your OS-9 programs can then be called up with a single keystroke. It can also change the data and execution directories of any OS-9 operating system.

With my 512K CoCo 3, I was capable of building the required "menu options" file quickly and easily. Building the required batch files that are to be executed in accordance with my selection was a piece of cake. Now the menus presented reflect the types of OS-9 files my hard drive contains. I press one key from the menu calling up BASIC09, and within seconds it pops up on my 80-column screen. Impressive.

I wondered how fast it would be to get a file buried within my hard drive. So I exited BASIC09, and *Hard Disk Organizer* automatically returned to my screen. It sorted through a huge pathlist that I normally type in by hand, and all I did was press one key. It operated quickly and flawlessly.

The program is compiled in C language for speed and portability. It fully supports OS-9 windows and remote terminal users. Many different terminal configurations are supported, including ANSI, ATS and Z19.

The disk is not copy-protected, so you are capable of making a backup copy for safekeeping. The documentation is well-written and takes you step-by-step through a lot of examples, so you can get your system up quickly and to your liking.

The documentation states that the software can be used successfully on a CoCo 2 in addition to a CoCo 3, with Level I and II OS-9 systems. No memory requirements are mentioned in the documentation. I found that the software operated flawlessly on my 512K CoCo 3 but would not operate on a 128K CoCo 3 because of insufficient memory.

I ran into the same memory problem when trying the CoCo 2 version on my 64K CoCo 2. It would not operate completely due to the procedure of "forking." (To fork a process means to create a process as a branch of another process — a subroutine.) It could not fork large application programs on the lower-memory machines, due to the available free memory. But, to be fair, the author does mention that he is developing a procedure to "chain" to the application program instead of fork.

Considering all that this software does, I feel it is reasonably priced and well worth the money for 512K users. You do not need to be an OS-9 expert, and in fact I feel this software will benefit those who are beginners, especially because new OS-9 users often have a hard time getting used to typing long pathlists.

(Robert A. Hengstebeck, 408 Grandview Ave., Feasterville, PA 19047, 215-322-5455; $24.95)

— Brian R. Smith

Software CoCo 1, 2 & 3

EZGen — OS-9 Module Editor

EZGen from Burke & Burke is the kind of product that most OS-9 users will probably not need to use often — but when you need it, you really need it. As its name implies, *EZGen* is a module editor for the OS-9 Level I or II operating environments.

My initial reaction to the product was one of minor confusion. After all, why would anyone want to edit a module? It turns out that almost all OS-9 users

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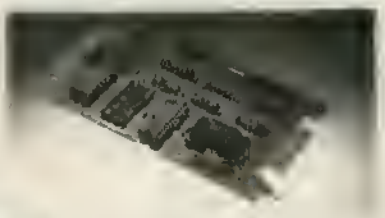

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will destroy you and your ship. You get three misses before the game is over.

Frequently you will see the message "Press the Space Bar" displayed in the window. This is a warning that an alien vessel is about to materialize in front of your ship, and you must deploy your defense shields for protection. This is where I had trouble with the program.

As your ability to destroy the attacking meteors improves, you will move to the next level of difficulty. One such level concentrates on the "second" row of keyboard keys, or the one just above the home row. The different levels are intended to drill the user by requiring all of the keyboard keys to be depressed in various random character sequences. As levels are increased and progress is made, the user becomes a keyboard commander and earns a certificate available from the author.

Like most skills, typing requires a lot of practice. *Keyboard Commander* can provide some of the necessary practice in a manner that children will enjoy. The program provides the beginning typist with a clever, challenging way to learn the location of the various keys on the CoCo keyboard. Programs that use a "game" approach have proven to be effective learning tools. *Keyboard Commander* is such a program.

Keyboard Commander is supplied on a non-protected disk. The program utilizes artifact PMODE4 colors, and it looks best on a color composite monitor or a TV set. (If you use an RGB monitor with your CoCo 3, you will not be able to see the beautiful colors this program has to offer.)

(E.Z. Friendly Software, 118 Corlies Ave., Poughkeepsie, NY 12601, 914-485-8150; $24.95 plus $1.50 S/H)

— Jerry Semones

Software CoCo 1, 2 & 3

Spellbound — Wizards, Warriors and Dungeons

Down in the lowest dungeon waits the Archwizard! Can your hardy band of Adventurers overcome monsters, avoid hazards and gain enough strength to defeat him? Can you guess his name and banish him forever? It will take many hours to find out in this Dungeons & Dragons-type text Adventure.

Visit the Adventurer's Guild to create your team, collect them at the Unicorn Tavern, then go on over to Elmo's Trading Post for equipment. Choose well, for in the vast dungeons below there are many monsters intent on destroying your team. Your characters may be human, dwarf, gnome or elf and function as paladin, fighter, thief, priest or wizard. CoCoists with a printer will be able to make a hard copy of both the roster and individual inventories. The latter come in very handy as the game progresses. I made an accordion-fold booklet that I consulted at every encounter and updated while in "camp."

"The dungeons abound with secret passages, treasures, tricks, hazards and monsters. The deeper you go, the greater the hazards and the better the rewards."

The game is easy to play — just press a key. In the dungeons, the screen is divided into two parts. To the right is a list of the characters and a move menu. To the left is a view of the dungeon, in perspective, as you see it looking forward two squares. Mapping is a bit tricky at first. Careful study will soon make it clear. If you really get lost, you can have your wizard use the "map" spell. You won't see a diagram, just coordinates of your location relative to the Bronze Door (entrance). I found this was adequate.

Camp is available any time there is no attack in progress. It is a place to view inventory, make changes, use spells (heal) or sleep (save). Each level of advancement adds a new spell; some protect or heal the Adventurers and others aid in defeating monsters. For proper updating of the disk, the Adventurers should retire to the Green Dragon Inn; however, camp may be more convenient at times.

The dungeons abound with secret passages, treasures, tricks, hazards and monsters. The deeper you go, the greater the hazards and the better the rewards. (Dungeon 6 is a zinger! Teleporting from Dungeon 5 to 7 would have real appeal.)

There are other places aboveground that are of interest: The Temple of Ymiro offers healing and advancement, and the library may hold some clues.

The documentation is very good. The author offers full technical support (but no clues!). Send a stamped, self-addressed envelope *(SASE)* for a reply to your questions. I used both CoCo 1 and CoCo 2 with no problems. The manual is very useful. The choices and spells are fully explained, so a novice can play the game as well as the more advanced.

This is a game more for Dungeons & Dragons fans than Adventure addicts. The action and the objects are average, but the dungeons (mazes) are excellent. *Spellbound* is written in BASIC, which makes for a brief delay when leaving camp. There is nothing wrong; in a short time, the screen clears and the game continues.

The biggest drawback is the lack of sound — no beeps to warn of attack or danger. The author is planning to remedy this. Some messages disappear too fast; however, the important ones wait for a key press.

There is enough room on the disk for 12 characters, which can be used six at a time. The extra characters should be developed for future use. Several backups are recommended for emergencies. It will take many hours, maybe months, to be ready for a confrontation with the Archwizard. I am neither a novice nor an expert (though I am good at mapping), and I enjoyed playing the game. *Spellbound* requires 32K, one disk drive and a CoCo 1, 2 or 3.

(Thor Software, Suite 162, 9431 Westport Road, Louisville, KY 40241, 502-588-5969; $16.95; First product review for this company appearing in THE RAINBOW.)

— Audrey De Lisle

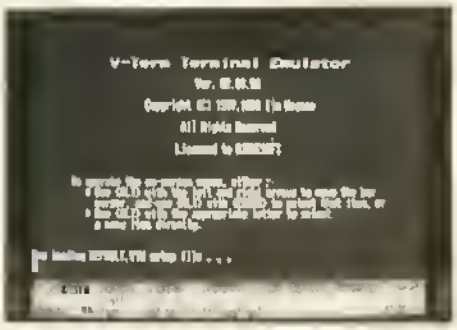
Software CoCo 3, OS-9

Hard Disk Organizer — Type Around Long Pathlists

Don't let its name fool you — the *Hard Disk Organizer* will organize your OS-9 floppies, too.

In a hard drive system, the CMDS directory will invariably become unmanageable due to the number of executable programs found there. *Hard Disk Organizer* allows a user to develop menu-driven pathlists so that any application program can easily be accessed.

Vidtex emulation not only supports wide character display, but also medium and high resolution RLE graphics.



I was able to decide exactly how I wanted my screen to appear, including border color, background and foreground color of both the main screen and the menu display by cycling through the 64 possible colors available for each. If you spend a lot of time in front of your monitor as I do, I think you will find this very useful in finding a combination that is easy on the eyes.

Going from one BBS to another and searching for some of the excellent public domain programs that are out there is one of my favorite pastimes. If you've ever downloaded a file from a BBS I'm sure you know how annoying it can be having to stop, save the file to disk and then clear the buffer before you can either download or upload another file. *V-Term* can save you some time. *V-Term* uses a RAM disk type buffer that allows you to have several different files in the buffer at the same time.

You are limited only by the amount of buffer memory available, which in a 512K CoCo leaves about 456K available for buffer storage. A 128K CoCo would have a 72K buffer. This buffer could save you a lot of time and money if you do much in the way of long-distance file transfers. *V-Term* also gives you the option of saving your files to disk instead of memory. While I am on the subject of file transfers, I think I should point out that *V-Term* gives you the options of using either line-oriented ASCII, Xmodem, Xmodem CRC or Ymodem transfer protocols.

V-Term will work with just about any hardware configuration. This includes the back-panel serial port (up to 2400 baud), the DCModem pack, and even deluxe RS-232 packs that have been altered to be addressed at $FF6C to $FF6F. Not to mention 35-, 40- or even 80-track drives (providing the DOS you are using supports 40 or 80 tracks — but not *JDOS*). This should be a welcome feature to those of you using the popular *ADOS-3*.

I must admit the program lacks one feature — the ability to write to the buffer. I did not consider this to be a major problem, though, because it is possible to write to the buffer using the VT-100 mode and *V-Term*'s "snapshot" feature, which copies the current screen to the buffer. The author told me that he plans to include this option in future versions of *V-Term*. I was also told that anyone currently using Version 1.0 can upgrade to Version 2.0 for just $7 plus $3 postage and handling.

Overall, I found this program to be everything I could hope for in a terminal program and well worth the price. I would also like to add that the distributor was extremely courteous and helpful with the few questions I had and even went out of the way in helping me get in touch with the author, who was on vacation at the time. In my opinion, this kind of service is priceless.

(Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, 301-256-7558; $39.95 plus $3 S/H)

— Bryan Gridley

Software CoCo 1, 2 & 3

Keyboard Commander — Learn To Type While Saving the Galaxy

Keyboard Commander is a typing tutor written for the 64K CoCo 1 or 2 (and CoCo 3) that teaches typing basics in a most unusual way: The student becomes a commander of a spaceship, and the keyboard keys are the controls. Interesting sound effects give the program an arcade flavor.

After the program loads and executes, you will see the inside of your spacecraft, the window and the controls (which just happen to be in the form of the CoCo keyboard). Transparent hands are shown in the "home position" and can be seen moving about the keyboard during flight.

The object of *Keyboard Commander* is to shoot down the "letter meteors" that randomly rush toward your ship. You destroy these meteors by pressing the letter on your keyboard control that represents the letter attacking your ship. If you fail to press the correct key, or if you take too long, the letter meteor

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screen as it did on the text screen? That is, if the original program had PRINT@ 294, "TEST", *how would I know where to position the* DRAW *equivalent?*

Allen Owens
Monticello, SC

Good question, Allen. I've done a lot of what you are proposing, so I think I can help clarify it for you. At first, I did a lot of guessing. Then I stopped to think about it. To illustrate what I learned, let's use a PMODE 4 screen.

Keep in mind that on the PMODE 4 screen, you have 256 pixels across by 192 pixels down on which to position text. If you divide the 256 pixels by 32 (the number of characters across on the text screen), you get eight. This is the width of each character. Now divide 192 pixels by 16 (the number of characters down on the text screen). The characters are 12 pixels high.

There are three steps in placing text on the graphics screen. First, you must define each character and put it into A$(32) to A$(90). This will give you most characters, excluding lowercase. Second, you must define the DRAW area, and finally, you must GOSUB to the DRAW subroutine.

Suppose you want to put the message "Basically Speaking" on the text screen. Simply type the following:

```
PRINT @ 294, "BASICALLY SPEAKING"
```

You now have the message displayed on the standard 32-column screen.

On the Hi-Res graphics screen, you would type the following:

```
A$="BASICALLY SPEAKING:"DRAW
"BM48,108":GOSUBxxxx
```

(where *xxxx* is the line number at which your DRAW subroutine is located).

Why coordinates 48,108, you ask? Simple. PRINT @ Location Number 294 on the text screen is six spaces over and nine spaces down. Multiply 6 by 8 (the width of your graphics character) and you get 48. Multiply 9 by 12 (the height of each character) and you get 108.

If your message doesn't look centered, edit the message line to read PRINT @ 295 instead of 294, and the message will be centered. On the graphics screen, however, you change the first DRAW coordinate from 48 to 56, since you have to move eight more pixels to the right to equal one space on the text screen. Now your DRAW coordinates are 56,108.

The message is now centered *across*. To move closer to the center *up and down*, type PRINT @ 231 instead of 295. On the graphics screen, you will need to move up two spaces (24 pixels). To match the position on the text screen, your new DRAW coordinates should be 56,84.

Thinking logically is as essential as knowing how to program the computer. Everything *the computer* does relates to numbers in one way or another. I found out some of what I know purely by accident. The rest fell into place as I made changes and discovered that most of the changes in coordinates were divisible by 8. (Hmmmmm.)

Questions about specific BASIC programming problems can be addressed to BASICally Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. We are unable to answer letters individually.

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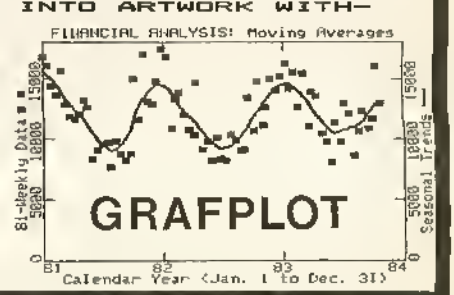

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C O C O

Q&A

CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

Speaking of DRAM Prices . . .

In this time of high DRAM prices (which has forced most RAINBOW advertisers to either charge up to $200 for an upgrade or supply no chips with 512K boards), I am pleased to report that I recently bought Tandy's 512K CoCo 3 upgrade for under $140.

Marlin Lee Simmons (LINLEE)
Bridgewater, VA

The DRAM-chip price situation is unfortunate. Dealers and end users alike have been hurt by the part's price increase. I believe Tandy was able to order a large quantity of these chips at a "locked-in" price. However, soon (perhaps before readers see this printed) Tandy will be forced to raise its prices, too. The increases in the prices charged by RAINBOW advertisers for 512K CoCo 3 memory upgrades reflects the extreme increase in cost for the chips. Note, too, that the price of these chips varies from week to week (sometimes from day to day), so it is often impossible for dealers to post a price in the magazine, which is distributed a month or more after their ads are submitted.

Increased Volume

When I hook a speaker to the audio output on my CoCo 3, the volume is very low. How can I use an amplifier with it?

Matt Hazard
Columbia Station, OH

Feed the signal coming out of the audio output jack on the CoCo 3 into the auxiliary input on any high fidelity amplifier. Use that to drive a speaker. You could also hook the audio output of the CoCo 3 to the audio input of a Radio Shack speaker-amplifier (Cat. No. 277-1008) using Radio Shack cable 42-2444.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Memory Upgrades and a 3½-inch Drive 1

I'm considering increasing my CoCo 3's memory to 512K and getting one of the new word processors specifically designed for the CoCo 3. However, the buffer of some of those programs exceeds the storage capacity of my 5¼-inch drives. Will a 3½-inch drive work as Drive 1? How would I hook one up? I have a standard Radio Shack controller and a FD 502 as Drive 0.

Paul R. Broshear
(GROUCHY)
Saddle Ridge Trail, TX

Your major concern is how to best use one of the current generation CoCo 3 word processors, and 512K is not needed for such CoCo 3 word processors as *Telewriter 80*, *Word Power 3.1*, *Telewriter 128*, or *VIP Writer III*. The jump from 128K to 512K really does not add much in terms of actual function. At the current DRAM prices of $12 a chip, the 512K upgrade is hideously expensive.

512K is essential if you want to run programs under OS-9 Level II. But for most Disk BASIC word processor programs, 128K should be all you ever really need. As you noted, Disk BASIC is not set up to save files bigger than 153K of data (the capacity of a single-sided disk) even with double-sided drives. You can go to 3½-inch drives. They are electrically identical to 5¼-inch drives, and using ADOS (from Spectrosystems), you can store up to a 350K file on each side of the disk. Some of the hard drive systems for the CoCo (like Burke & Burke's or RGB System's) can also handle large files under Disk BASIC. (Of course, they cost a few hundred dollars.) I do recommend that you get ADOS, if only to access your FD 502 on both sides (as if it were two drives). This will not increase the size of the biggest file you can store, but it will allow you to store twice as much on a disk.

Artifact Colors on the CM-8

Is it possible to build a TV tuner that hooks up to the CM-8 monitor or to add a composite video input to the CM-8 monitor with some adapter or hardware project? I bought a CM-8 and am unable to see the red and blue artifact colors in the many games that use the PMODE 4 screen.

Perry M. Dueck
Rosenort, Manitoba

You *cannot* modify the CM-8 for RF or composite video input. While it is technically possible to do what you ask, there are no commercial devices on the market to do that and cost less than a brand new Magnavox monitor. Making such a device from scratch would involve considerable design effort, and no one who could make such a device would bother to make one for the CM-8. Those who have not yet bought an RGB monitor should note that the CM-8's lack of composite video input makes it *incapable* of displaying proper PMODE 4 artifact colors. The Magnavox monitor (sold by many RAINBOW advertisers) has composite video inputs (as well as other inputs) and has a sharper, higher resolution screen than the CM-8.

I suggest that those who have a CM-8 buy *RGB Patch* from Microcom. This program will allow the CoCo 3 to display some degree of "artifact color" on a CM-8 when used with most Disk BASIC games and other graphics programs. Sadly, *RGB Patch* will not help with programs running under OS-9 (including the newer Tandy OS-9 games like *Rocky's Boots* and *Robot Odyssey*).

Also, see Steven Ostrom's "Artifact

Colors on CoCo 3's RGB,"(February '88, Page 114).

Specifying CoCos

I have a CoCo 2 (Model 26-3127B). What sort of a CoCo is that? Also, where can I get the 256K/512K Super RAM cartridge?

Michael D.
Zanesville, OH

The Model 26-3127B is the last 64K Extended BASIC Color Computer 2 that Tandy made before discontinuing production of the CoCo 2. Its circuit board was set up so that it could accept 64K of memory in any of three different ways: eight 64K-by-1-byte chips on the main board, eight 64K-by-1-byte chips on a plug-in satellite board, or two 64K-by-4-byte chips in two 20-pin sockets on the main board. This model also featured the T1 VDG chip that, with special software, supported lower-case characters in the 32-column video mode.

The 256K/512K Super RAM is sold by CRC in Canada. It is a RAM-disk card that plugs into the Multi-Pak Interface. It works quite well under OS-9 but has limited compatibility with Disk BASIC programs.

Monitoring Questions
Super VHS, 80-Columns and 3½-Inch 80-Track Drives

I have three questions. First, will the Magnavox 8CM515 monitor support the new super VHS video format? Second, my television cuts off the last two or three characters on the left-hand side of the screen when I put my CoCo 3 in 80-column mode. What can I do about this? Finally, how can I use 3½-inch 80-track drives under Disk BASIC?

Bill Sanders
Chula Vista, CA

First, the Magnavox 8CM515 does not offer the sort of chromanance/luminance video input used with the super VHS format video signals. However, if that format catches on, adapters that will convert a chromanance/luminance signal to a RGB signal should become available commercially. Such adapters, if and when they are available, will allow any RGB analog-capable monitor to be used with the super VHS format.

Second, your problem with missing characters is caused by the *overscan* setting for the horizontal-width control. This is common to most broadcast TV sets. The CoCo 3's 40- or 80-column mode was not really designed for use with broadcast televisions. In fact, programmers who write 40-column based software for CoCo 3s with television monitors know about this problem and don't use the extreme left columns. In theory you could open up your TV and adjust the horizontal width internally (usually there is a ferrite slug in a coil somewhere that controls this), but when watching TV shows you'd probably see a black border at the left.

Finally, Disk BASIC is poorly suited to use with 80-track drives, and I recommend that you do not try it. If you insist on trying, check with Burke & Burke about its *Hyper I/O*, or with Spectrosystems about ADOS. Those companies make patches that (to a certain extent) will allow you to use 80-track drives with Disk BASIC.

Upgrading the Modemphone

Is there any way to upgrade a Tandy Modemphone to run at 1200 or 2400 baud?

Keith H. March
(KEITHMARCH)
Continental, OH

I'm afraid that 1200- and 2400-baud modems are different both from each other and from 300-baud modems (more expensive to make, too). There is no reasonable way to convert one to another. You *must* buy a new modem if you want higher baud-rate capability than your current modem supports.

Major Circuitry Differences

A circuit for the CoCo 1's color monitor driver appeared in Hot CoCo, *August '83. I was unable to get this circuit to work on a CoCo 2. Can you help me?*

Fulton Smith, Jr.
Southfield, MI

Even though the circuits may appear similar at first glance, the color video circuitry of the CoCo 2 is quite different from that of the CoCo 1. Unlike the CoCo 1, the CoCo 2 uses the RF modulator portion of the 1372 chip. Therefore, there is virtually no color video signal available where there is on the CoCo 1 circuits. Color monitor driver circuits for the CoCo 2 are considerably more complicated than those for the CoCo 1, and because there were several available commercially when the CoCo 2 was in production, I never bothered to develop one myself. Now that the CoCo 2 is no longer in production, many of those monitor drivers may not be available. Try Computerware, and check the ads in RAINBOW for other possible sources.

ADOS to the Rescue (Again)

How can I permanently program F1 and F2 to complete various functions or commands? How can I do the same with other keys?

Claud Gervais
Heroux ville, Quebec

Although frequent readers of this column may be tired of seeing me plug the system, ADOS (sold by Spectrosystems) is the answer to your question. Once configured and burned into the EPROM that will replace your Disk BASIC ROM, ADOS allows you to have single key strokes produce customized results *permanently*, (i.e., creating various BASIC programming word or multiple-word commands).

Asking the Impossible

Can I use a CoCo 3 and a DCM 6 modem to send Spectaculator *worksheets from Ymodem to my company's FAX machines?*

Augusto Vajsest
Lima, Peru

I'm afraid that is not possible for two reasons. First, spreadsheets consist of character, or ASCII, data. FAX data consists of graphic, or photographic, data. Second, the way in which 300-baud computer modems encode data differs completely from the way in which the modems in FAX machines encode their data.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

T/S Spell and *TW-64* Compatibility

I recently purchased Tandy's OS-9 based spelling checker, T/S Spell. *Files saved to disk under my favorite word processor,* TW-64, *will not read into* T/S Spell. *I assume that the difference in directory locations between Disk* BASIC *and OS-9 is at least part of the problem. Both are super programs. Is there a way to make them compatible? I have a CoCo 3 with 128K, two Radio Shack disk drives, a CM-8, a DMP-200 printer, and a CCR-81 recorder.*

Edward Scott
Canaan, CT

R/ The directory structures for OS-9 and Disk BASIC differ completely. To check the spelling of a *TW-64* document with *T/S Spell*, save the document in ASCII format and then use a file transfer program (like *TRSCopy*) to move it over to an OS-9 diskette.

ROM Pack Problems

I have just received my new 128K CoCo 3. I have a Radio Shack Multi-Pak Interface (MPI), cat. #26-3024. When I use a power strip to power up the computer and MPI together, everything works except my EDTASM+ *pak. I have no problem switching between other packs, but when I switch to* EDTASM+ *the screen fills with garbage. Will a new PAL chip in the MPI solve this problem? Is there a patch to upgrade OS-9 1.01 to Level II? Is the fan in the FD 501 disk drive necessary, or can I remove it? Where can I get an extension cable for my keyboard?*

Bill Irwin
Toledo, OH

R/ First, count yourself lucky that only one of your ROM packs is not compatible with the CoCo 3. The PAL chip upgrade is unrelated to this problem. You could use Roger Schrag's patches to move your *EDTASM+* code to disk. (see "Patching *EDTASM* to Run on Disk," December '82, Page 29; "Patching The Patch: *EDTASM* to Disk Revealed," April '83, Page 194; or "Superpatch for *EDTASM*," September '83, Page 66). Second, OS-9 Level I and Level II are completely different prodcts. There is no patch or upgrade available; however, you *can* use the assembler and some of the utilities from Level I with Level II. Third, the fan in the 501 is there to dissipate the heat generated from the power supply. Removing the fan could shorten the disk drive's life. Finally, Marty Goodman has contracted with several RAINBOW advertisers to sell his keyboard extender cable.

Needs a Patch

I typed in the listing for PAKXFER *from the December '87 issue ["Pak to Disk Transfer," Page 152]. I also looked over the patches for problem ROM packs listed in your March '88 column [Page 16]. Do you have a patch for recording the new CoCo 3 ROM Packs to disk? I am interested in recording* Thexder *and* Shanghai.

David Morrison
Brewer, ME

R/ See the August '88 "CoCo Consultations" [Page 162].

Information, Please

Where I can find extensive information on the following: CoCo's sound I/O, data transmission through the RS-232, the ROM port, CoCo 3's new machine language instructions and addressing the disk drive directly (not through ROM subroutines)?

Dave Brain
Troutdale, OR

R/ Order the CoCo 3 Service Manual (Part #MS-2603334, $15.60) from Tandy National Parts, and read Scott Honaker's "Exercise Your Drives" [RAINBOW, June '88, Page 110].

Try the Clone

I bought a copy of Xterm *because the ad said that it works with the CoCo's serial port. This may be true, but I have OS-9 Level II, which will not work with the CoCo 2.* Xterm *and* Wiz *both call for the RS-232 Pak. According to my local Radio Shack, the RS-232 Pak is no longer available. I would really like to use my OS-9 with a terminal program, but they all call for the RS-232 Pak. Is there a substitute?*

Michael E. Phelps
Belleville IL

R/ Disto is currently marketing an RS-232 SuperPack clone of the original Tandy Pak (without the virtually useless ROM-based communications software) for $49.95.

Device Descriptor Problems

I have a 512K CoCo 3 with a Multi-Pak Interface, a hard disk interface, 15-Meg hard drive, and OS-9 Level II. I can't get OS-9 to talk to the hard drive. If I boot with Level I Version 2.00 and attempt to format /h0 I get Error #247 (seek error). When I copy the device descriptor and device driver to a Level II disk and try to format, I get Error #237 (memory full). I don't really want to reformat the drive, but I

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Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

can't access any of the data already stored there. The hard drive worked fine with OS-9 Level I (both versions). My problems started after I had the Multi-Pak upgraded to work with Level II. Now that the Multi-Pak has been modified, I can't even use it with Level I! My floppy controller works fine in Slot #4 of the Multi-Pak, so I don't think the problem is in the Multi-Pak itself. Should the software be modified? I have spoken to five different people at Radio Shack stores, and no one knows what to do about this problem.

Charles Steinfeldt

Rx You need to change offset $0E of each of your hard disk device descriptors from $FF to $7F (probably /h0 and /dd). The hard drive driver and descriptor for OS-9 Level II are included in the *Development System* from Radio Shack.

A Simple Sparklie Solution

Is there a simple way to address the sparklie problem that does not entail replacing the soldered-in microprocessor or the $50 GIME chip?

Juan Diaz
San Juan, PR

Rx I solved the sparklie problem (small bouncing dots on the screen during 2-Mhz operation) on my CoCo 3 by following Roger Krupski's advice. I replaced R9 and R10 (47-ohm resisters) with 100-ohm resistors and C10 and C11 (39-pF capacitors) with 47-pF capacitors. I carefully clipped the old resistors and capacitors, and I soldered the new ones onto the remaining leads — unsoldering was not required. For more information on the sparklie problem, see Marty Goodman's "Quick Fixes," October '88, Page 58.

Reprint Request

I tried to get a reprint of your article, "Disk Utilities," from CW Communications, but I did not receive a reply. Could you suggest any other way to get a reprint of this article?

Floyd Craig
Toronto, OH

Rx Try calling its business office at 1-800-441-4403.

Upgrade Prescription

I want to upgrade an early CoCo 1 D-Board to 64K. I have Color Computer Secrets Revealed *by Disk 'N Data, which shows the upgrade of later models but does not provide the directions needed to upgrade earlier models. Can you help?*

Lonnie Morosic
McCook, NE

Rx See B. H. Alsop's "D-Board 64K Upgrade," RAINBOW, March '83 [Page 100]. This article offers a unique approach using modified sockets, which avoids the need to cut traces.

Hard Disk Guide

I have been considering getting a hard disk for my CoCo 2, but there are several things that I need to know before I invest $600 to $700. Does a hard disk work on the CoCo like it does on an MS-DOS computer? Is there an established hierarchy of directories like in MS-DOS or OS-9? There are several systems advertised in RAINBOW, but the ads don't give enough information about the product to help me choose a system.

Erasmo A. Martinez
Watertown NY

Rx I have been using a Seagate ST-225 20-Meg hard disk with a Western Digital controller and a Burke & Burke CoCo XT-RTC interface for over a year. It cost me around $450. OS-9 has the same hierarchical directory structure as MS-DOS, but it had it first. OS-9 was designed for — and runs well on — a hard drive. Disk BASIC, on the other hand, was designed for 35-track, single-sided floppy operation. Therefore, its hard disk operation techniques vary from using the hard drive as several floppies to modifying Disk BASIC to handle the whole drive. While OS-9's operation with a hard drive works with all of your software, Disk BASIC's operation will reveal some incompatibilities.

A Patch Explained

In your June '87 column [Page 90] you answered a question about 3½-inch drives and offered a short program patch to be used with Modpatch. *Near the end of the answer you stated, "You can add the missing descriptors to the modules directly and build the system directly with* config." *You were talking about /dd and /d0 for 80-track drives. How do you do this? I have two 40-track double-sided disk drives, one 80-track, 3½-inch disk drive and* DMode *from Computerware (only for 40 tracks as far as I know). I want to get the* Save *command for Level II. Would you give me the patch program and the steps I need to follow. Also, is* DMode *geared for 80 tracks or do I have to buy* SDisk3?

E.G. Douglas
Stillwater OK

Rx If you have Kevin Darling's *DMode*, you can patch the descriptors directly on disk in your Config Modules directory. If you patch with Modpatch and then use Save, you'll need to know the address offsets in the descriptors (Figure 1).

You may also want to modify offset $14, which controls the step rate ($00 for 30 ms, $01 for 20 ms, $02 for 12 ms and $03 for 6 ms). Do not forget to verify. *SDisk3* is not needed if you only want to support other size drives or vary the step rate under OS-9 Level II. The Level I drivers for OS-9 were hard-coded for single-sided operation. Consequently, *SDisk*, or an equivalent, was required for two-sided operation. However, with Level II, all you need for different size drives is to modify the device descriptors.

	Single-sided	Double-sided	Double-sided
Offset	35 track value	40 track value	80 track value
$16	$01	$01	$03
$18	$23	$28	$50
$19	$01	$02	$02

Figure 1

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, piek Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

Building on the skills developed in earlier games

Growing Up With CoCo

By Fred B. Scerbo
Rainbow Contributing Editor

The last three columns have presented a series of four early-childhood education programs: *Opposites* (parts I and II) and *Match Game of Opposites* (parts I and II). From the mail I have received on the first installment, I believe that these programs will help fill a vacuum in the CoCo Community's software library.

This month, let's look at the final installment in this series. *Picture This* allows children to use all the skills developed in the first four programs and take them one step further. While some of the graphics will be the same as those in the last four programs, the DATA statements are *not* interchangeable. The alphanumeric part of each graphics string has been deleted. Instead, graphics text characters will be represented by an array of graphics alphanumeric strings.

Our Purpose

Why do we need this fifth program? In both the *Opposites* and *Match Game of Opposites* series, we dealt strictly with abstract concepts. We related a picture to a word and to its opposite.

In *Picture This*, the user must take this knowledge and correctly insert the correct word in each sentence. Each concept's graphic representation is still given, but this time each concept is shown individually. For each concept, a sentence with a missing word (blank) represented by the graphic is presented with a series of possible answers. The question would appear in the following format:

```
THIS LITTLE SNAIL IS
VERY . . .
  A) THICK
  B) SLOW
  C) DRY
  D) FAST
```

In this example, the screen would include our snail graphic. (So *that's* where our old friend the snail from *Snail Invaders* [February '82, Page 17] and *Snail's Revenge* [July '83, Page 138] turned up. I have promised long-time readers his return for some time.)

As with quiz programs presented in previous issues, the user needs only to press the letter representing the correct response. The program corrects and scores the responses.

Typing in the Program

This program listing is much longer than listings for the last four programs. Since you cannot use the DATA statements from previous months, type in the program very carefully. There are no bugs in the program. Any bugs that show up will be your own. To be safe, get RAINBOW ON TAPE or DISK for a bug-free copy.

Every data line that includes a statement also has an asterisk (*). This will be recognized as an underline in the program. I thought that indicating a blank in this manner would be more attractive than using a string of periods. Therefore, type each data line exactly as you see it.

Using the Program

When you run the program, the familiar title screen will appear. You will be asked to select a level from one to eight by pressing the appropriate number. There are a total of eighty graphics and statements, so each level will present 10 questions. Each set of 10 will be assorted randomly, but you can control the set shown by selecting the level.

As with our other quiz programs, you only need to select the letter corresponding to the correct choice. If the answer is correct, the screen will display, "Very Good." An incorrect response will cause the screen to print "Sorry!" In both cases, an arrow will flash next to the correct response.

If you press ENTER, you will move to the next screen. You may also press @ to go to the scorecard. At that point, you will be asked if you want to try again. You may then press C to continue where you left off, Y (yes) to start a new quiz or N (no) to quit.

That's all there is to it. Young users may need an adult to read the sentences. This promotes the whole educational process with your children and gives you and the kids some *fun* time together. (Learning can be fun for everyone, right?)

Conclusion

This month's listing is *very* long. Since we covered the educational theories in the last three columns, there is no need to repeat them here. I hope you find this program as useful as the ones from the last three months. They make a nice set, and they also help teach some important skills.

Once again I must thank those of you who have donated your old silver CoCos to our special needs classes. It seems that just when I think I have seen the last donation, another kind soul sends us another large box. As always, the machines are put to good use in one of our special needs classes. See you next month. □

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

```
45 .....208  635 .....143  1170 .....175
105 .....251  705 .....141  1230 .....253
175 .....209  790 .....170  1280 .....84
240 .....252  865 .....145  1335 .....35
315 .....42  940 .....65  1380 .....119
395 .....24  990 .....0  1440 .....115
470 .....254  1045 .....230  1495 .....196
530 .....70  1115 .....232  END .....155
580 .....86
```

The listing: PICTURES

```
1 PCLEAR1
2 REM ************************
3 REM *      PICTURE THIS      *
4 REM *    BY FRED B.SCERBO    *
5 REM *     6Ø HARDING AVE.    *
6 REM *  NORTH ADAMS,MA Ø1247  *
7 REM *   COPYRIGHT (C) 1988   *
8 REM ************************
9 CLEAR1ØØØ
1Ø CLSØ:PRINTSTRING$(64,252);
15 FORI=1TO224:READA:PRINTCHR$(A
+128);:NEXT:PRINTSTRING$(64,243)
;
2Ø DATA61,6Ø,61,52,62,53,6Ø,58,6
2,61,6Ø,58,58,16,58,62,6Ø,58,62,
6Ø,21,28,3Ø,29,21,24,29,2Ø,3Ø,21
,28,29
25 DATA53,,53,,58,53,,58,58,53,4
8,58,58,,58,58,,58,58,,21,,26,21
,21,16,21,16,26,21,16,21
3Ø DATA53,,53,,58,53,,48,,53,48,
,58,,58,58,,58,58,,,,26,,21,,21,
16,26,21,,16
35 DATA53,6Ø,6Ø,48,58,53,,,,53,4
8,,58,,58,62,62,56,62,6Ø,,,26,,2
1,28,29,16,26,2Ø,28,29
4Ø DATA53,,,,58,53,,,,53,48,,58,
,58,58,57,,58,,,,26,,21,,21,16,2
6,,,21
45 DATA53,,,,58,53,,58,,53,48,,5
8,,58,58,53,,58,,,,26,,21,,21,16
,26,16,18,21
5Ø DATA6Ø,56,,52,6Ø,52,6Ø,56,,6Ø
,56,,6Ø,6Ø,56,56,48,56,6Ø,6Ø,,2Ø
,28,,28,24,28,2Ø,28,16,28,28
55 PRINT@389,"   BY FRED B.SCERB
O   ";
6Ø PRINT@421," COPYRIGHT (C) 19
88  ";
65 DIM F$(6Ø,2),A$(2),B$(1Ø),C$(
1Ø),A(1Ø),N(1Ø),B(4),C(4),D(4),E
(4),F(4),AO(1Ø)
7Ø DIM L$(3Ø),H$(8Ø,4),AB(4)
75 FORI=1TO3:READ C(I),D(I),E(I)
```


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```
,F(I):NEXT:FORI=1TO3Ø:READL$(I):
NEXT:FORI=1TO2:READA$(I):NEXT:FO
RI=1TO8Ø:READP$(I,1),P$(I,2):FOR
LL=1TO4:READ H$(I,LL):NEXTLL:NEX
TI
8Ø COLOR1,Ø
85 GOTO18Ø
9Ø KK=2Ø
95 Z=LEN(A$):IFZ<23THENL$=A$:GOS
UB115:RETURN
1ØØ FORI=22TO1STEP-1:IFMID$(A$,I
,1)<>" "THEN11Ø
1Ø5 L$=LEFT$(A$,I-1):A$=RIGHT$(A
$,LEN(A$)-I):GOSUB115:KK=KK+16:G
OTO95
11Ø NEXTI:GOTO95
115 DRAW"CØBMØ,"+STR$(KK)
12Ø Q=LEN(L$):FORI=1TOQ:K$=MID$(
L$,I,1):K=ASC(K$)-64
125 IFK=-32THENK=27ELSEIFK=-18TH
ENK=28ELSEIFK=-1THENK=29ELSEIFK=
-22THENK=3Ø
13Ø DRAW L$(K)
135 NEXT
14Ø RETURN
145 DATA13Ø,6,246,8Ø,6,86,12Ø,16
2,13Ø,86,246,162
15Ø DATA U8R8D4NL8D4BR4,R2U8L2R8
D4NL8D4NL8BR4,NR8U8R8D2BD4D2BR4,
R2U8L2R8D8NL8BR4,NR8U4NR8U4R8BD8
BR4,U4NR8U4R8BD8BR4
155 DATA NR8U8R8BD4NL4D4BR4,U8D4
R8U4D8BR4,BR2R2U8L2R4L2D8R2BR6,B
R2NU4R8U8L4R8BR4BD8
16Ø DATA U8D4R4NE4F4BR4,NU8R8NU2
BR4,U8F4E4D8BR4,U8F8NU8BR4,U8R8D
8NL8BR4,U8R8D4NL8BD4BR4,U8R8D8NL
8NH4NF2BR8,U8R8D4L8R4F4BR4
165 DATA R8U4L8U4R8BD8BR4,BU8R8L
4D8BR8,NU8R8NU8BR4,BU8D4F4E4U4BD
8BR4
17Ø DATA NU8R6NU8R6NU8BR4,E4NH4N
E4F4BR4,BU8F4NE4D4BR8,BU8R8G8R8B
R4,BR8,BR2NU2BR8,BR2BU8U2R8D2G4B
D4L2BR8,R4ØBR4
175 DATA"BM2,124CØ","BM13Ø,124CØ
"
18Ø PMODEØ,1:PCLS1:SCREENØ,Ø:LIN
E(Ø,114)-(13Ø,192),PRESET,B:LINE
(6,12Ø)-(124,184),PRESET,B:PAINT
(2,154),Ø,Ø
185 FORI=1TO1Ø
19Ø AO(I)=RND(1Ø):IFN(AO(I))=1TH
EN19Ø
195 N(AO(I))=1:NEXTI
2ØØ PRINT@453,"  SELECT LEVEL (1
-8)  ";
2Ø5 X$=INKEY$:XX=RND(-TIMER):IFV
AL(X$)=ØTHEN2Ø5ELSEIFVAL(X$)>8TH
EN2Ø5
21Ø SCREEN1,1:LL=VAL(X$)*1Ø-1Ø:F
ORII=1TO1Ø:DRAW A$(1):DRAWP$(AO(
II)+LL,1)
215 A$=P$(AO(II)+LL,2)+".":GOSUB
9Ø
22Ø FORYY=1TO4:N(YY)=Ø:NEXTYY:FO
RYY=1TO4
225 AB(YY)=RND(4):IFN(AB(YY))=1T
HEN225
23Ø N(AB(YY))=1:IF AB(YY)=1 THEN
 FF=YY
235 NEXTYY:V=Ø
24Ø FORYY=1TO4:KK=KK+16:A$="
"+CHR$(64+YY)+". "+H$(AO(II)+LL,
AB(YY)):GOSUB95:NEXTYY
245 X$=INKEY$:IFX$=""THEN245
25Ø IFX$="@"THEN151Ø
255 V=ASC(X$):IFV<65THEN245ELSEI
FV>68THEN245
26Ø V=V-64:IFAB(V)=1THEN27Ø
265 NW=NW+1:DD=KK:A$="          S
ORRY":KK=146:DRAW"S8":GOSUB95:KK
=DD:DRAW"S4":GOTO275
27Ø NC=NC+1:DD=KK:A$="          V
ERY":KK=146:DRAW"S8":GOSUB95:KK=
KK+26:A$="         GOOD":DRAW"S8
":GOSUB95:KK=DD:DRAW"S4"
275 V=1:IFKK=1ØØTHENKK=32ELSEIFK
K=84THENKK=16
28Ø KK=KK+(16*FF):KK$=STR$(KK):D
RAW"BM4,"+KK$
285 DRAW"CØR16NH4NG4":FORYY=1TO9
Ø:NEXTYY
29Ø X$=INKEY$:IFX$=CHR$(13)THEN3
ØØELSEIFX$="@"THEN151Ø
295 DRAW"C1NH4NG4L16":FORYY=1TO9
Ø:NEXT:GOTO285
3ØØ COLOR1,Ø:LINE(Ø,Ø)-(256,11Ø)
,PSET,BF:LINE(8,122)-(122,182),P
SET,BF:LINE(132,122)-(256,182),P
SET,BF:NEXTII
3Ø5 FF=1:GOTO151Ø
31Ø DATA"BR6ØBD4F2ØL1ØD24L2ØU24L
1ØE2Ø"
315 DATA THIS ARROW IS POINTING
*
32Ø DATA UP,DOWN,LEFT,RIGHT
325 DATA"BR6ØBD4L1ØD24L1ØF2ØE2ØL
1ØU24L1Ø"
33Ø DATA THIS ARROW IS POINTING
*
335 DATA DOWN,UP,LEFT,RIGHT
34Ø DATA"BR16BD2ØR8ØM-4,+2ØL36M-
4,-18NL36BR12BU4E4UH4UE4BR1ØG4DF
4DG4BR1ØE4UH4UE4"
345 DATA THIS PICTURE SHOWS SOME
THING *
35Ø DATA HOT,COLD,DRY,WET
355 DATA"BR6ØBD2ØL4ND6L6ND2L4ND4
L2M+16,+32M+16,-32L16R4ND8R6ND4R
6L2U4H2U2H2L2H2L12G2L2G2D2G2D4"
36Ø DATA THIS PICTURE SHOWS SOME
```

```
THING *
365 DATA COLD,HOT,DRY,WET
37Ø DATA"BR5ØBD56R4U3ØR4U1ØR2U1Ø
E2U4RD4F2D1ØR2D1ØR4D3ØR4L22BR8BU
2U24BR4D24"
375 DATA THIS BUILDING IS SOMETH
ING *
38Ø DATA BIG,LITTLE,THIN,WIDE
385 DATA"BR68BD52H4L4U2NR4D2L4NU
ND4L4U2L4D2R4NH6L2G4"
39Ø DATA THIS INSECT IS SOMETHIN
G *
395 DATA LITTLE,BIG,WIDE,THIN
4ØØ DATA"BR24BD36E12G6F2ØR2ØE2ØF
6H12BL14H2G4L4H4G2BU1ØBL4NU4L2U6
E4R2BR26L2G4D6L2U4"
4Ø5 DATA A SMILE MEANS YOU ARE *
41Ø DATA HAPPY,SAD,SLEEPY,HUNGRY
415 DATA"BR34BD5ØH12F6E12R36F12G
6E12BU16BL28H2G4L4H4G2BU1ØBL4NU4
L2U6E4R2BR26L2G4D6L2U4"
42Ø DATA A FROWN MEANS YOU ARE *
425 DATA SAD,HAPPY,SLEEPY,HUNGRY
43Ø DATA"BR2ØBD22D2ØM+3Ø,+1ØNU2Ø
R5ØU2ØNL5ØM-3Ø,-1ØND8L5ØM+3Ø,+1Ø
M-3Ø,-1ØE2ØR5ØG2ØL1ØNE2ØL1ØNE2ØL
1ØNE2ØL1ØNE2Ø"
435 DATA THE BOX BELOW IS *
44Ø DATA OPEN,CLOSED,HEAVY,LIGHT
445 DATA"BR12BD16D2ØM+3Ø,+1ØNU2Ø
R6ØU2ØNL6ØM-3Ø,-1ØL6ØM+3Ø,+1ØR12
M-3Ø,-1ØR12M+3Ø,+1ØR12M-3Ø,-1ØR1
2M+3Ø,+1Ø"
45Ø DATA THE BOX BELOW IS *
455 DATA CLOSED,OPEN,HEAVY,LIGHT
46Ø DATA"BR9ØBD52U2E8U32H4L4G2D1
ØF2R4E4BL12U12H4L4G4D12F4R4E4BL1
2U12H4L4G4D12F4R4E4BL12U12H4L4G4
D12F4R4E4BL12D2G4L4M-1Ø,-6M-1Ø,-
2L2G4D4M+8,+4D2M+2Ø,+12F1ØM+6,+2
F2BE1ØH1ØM-8,-3BD36"
465 DATA THIS SHOWS YOUR * HAND
47Ø DATA LEFT,RIGHT,FAT,THIN
475 DATA"BR28BD52U2H8U32E4R4F2D1
ØG2L4H4BR12U12E4R4F4D12G4L4H4BR1
2U12E4R4F4D12G4L4H4BR12U12E4R4F4
D12G4L4H4BR12D2F4R4M+1Ø,-6M+1Ø,-
2R2F4D4M-8,+4D2M-2Ø,+12G14G2BH1Ø
E1ØM+8,-3"
48Ø DATA THIS SHOWS YOUR * HAND
485 DATA RIGHT,LEFT,FAT,THIN
49Ø DATA"BR3ØBD6D34R4E2U1ØR12F4R
12E4R12F4D12R1ØU2ØH8L18H4L4U8R12
U4L28D4R12D8L4G4L12U8H2L4BM+6Ø,+
4ØF4D4G2L4H2U4E4"
495 DATA THE FAUCET SHOWN BELOW
IS *
5ØØ DATA WET,DRY,HOT,COLD
```


THE POWER STONES OF ARD

THE QUEST FOR THE SPIRIT STONE

RAINBOW CERTIFICATION SEAL

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FEBRUARY 1985 "RAINBOW"

VIP CALC

Now every CoCo owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc displays 32, 51, 64 or 85 characters by 21 or 24 lines right on the screen. VIP Calc allows up to a 33K worksheet with up to 512 columns by 1024 rows! In addition, VIP calc has multiple windows which allow you to compare and contrast results of changes. Other features include 16 DIGIT PRECISION • trig. functions • averaging • algebraic functions • column and row ascending or descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • works with any printer. Embed printer control codes for customized printing. Combine spreadsheet tables with VIP Writer documents to create ledgers, projections, statistical and financial budgets and reports. Requires 64K. DISK $59.95

VIP Speller

INCLUDES 50,000 WORD DICTIONARY

VIP SPELLER

VIP Speller works with ANY ASCII file created by most popular word processors. It automatically checks text files for words to be corrected, marked for special attention or even added to the 50,000 word Dictionary. You can even view the word in context. Words can be added to or deleted from the dictionary or you can create your own dictionary! DISK $34.95

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```
5Ø5 DATA"BR3ØBD6D34R4E2U1ØR12F4R
12E4R12F4D12R1ØU2ØH8L18H4L4U8R12
U4L28D4R12D8L4G4L12U8H2L4"
51Ø DATA THE FAUCET SHOWN BELOW
IS *
515 DATA DRY,WET,HOT,COLD
52Ø DATA"BR1ØBD4ØR1Ø2L8E1ØM-8,+4
L6U4H2L2G4R4D4F4L2ØE1ØM-8,+4L6U4
H2L2G4R4D4F4L2ØE1ØM-8,+4L6U4H2L2
G4R4D4F4L2ØE2ØM-16,+8L12U8H4L4G8
R8BE4NLBG4D8F8BU28BR4F6NU16NE6"
525 DATA THE ARROW POINTS TO THE
 * IN LINE
53Ø DATA FIRST,LAST,MIDDLE,SECON
D
535 DATA"BR1ØBD4ØR1Ø2L8E1ØM-8,+4
L6U4H2L2G4R4D4F4L2ØE1ØM-8,+4L6U4
H2L2G4R4D4F4L2ØE1ØM-8,+4L6U4H2L2
G4R4D4F4L2ØE2ØM-16,+8L12U8H4L4G8
R8BE4NLBG4D8F8BU24BR74F6NU16NE6"
54Ø DATA THE ARROW POINTS TO THE
 * IN LINE
545 DATA LAST,FIRST,MIDDLE,SECON
D
55Ø DATA"BR56BD26S2M+36,+1ØF16L2
H4L4G4H4L4G4H4L4G4H4L4G6D22G2L2N
H2R2E2U22H6L4G4H4L4G4H4L4G4H4L4G
4E16M+36,-1ØS4BU1ØR1ØE4NH4R6E4U2
H4L1ØG4L12NG4H6L8G4D6F4R6F4R4E2R
2R6R4BR16NE6NR2ØNF6"
555 DATA THE CLOUD IS * THE UMBR
ELLA
56Ø DATA OVER,UNDER,AROUND,INSID
E
565 DATA"BR56BD2S2M+36,+1ØF16L2H
4L4G4H4L4G4H4L4G4H4L4G6D18G2L2NH
2R2E2U18H6L4G4H4L4G4H4L4G4H4L4G4
E16M+36,-1ØS4BD36NE6NH6NG6NF6BR1
6NE6NF6R22"
57Ø DATA THE MARK IS * THE UMBRE
LLA
575 DATA UNDER,OVER,AROUND,INSID
E
58Ø DATA"BR16BD2ØE2NR8ØR16E8R6NG
4R6NG4R6NG4R6NG4R6NG4R6NG4NG4R6N
G4R6NG4R6NG4R6NG4F8D2G8NH4L6NH4L
6NH4L6NH4L6NH4L6NH4L6NH4L6NH4L6N
H4L6NH4L6H8L16NR8Ø"
585 DATA THIS FEATHER IS SOMETHI
NG *
59Ø DATA LIGHT,HEAVY,FAST,SLOW
595 DATA"BR26BD46R68M-14,-3ØL1ØU
6H4L12G4D6L1ØM-14,+3ØBR18BU8U12B
R6NR6D12R6NU12BR6U12R6D12NL6BR4N
U6BR4NU6U4R4D4L4BU22BL14L4U4R4D4
"
6ØØ DATA THIS WEIGHT IS SOMETHIN
G *
6Ø5 DATA HEAVY,LIGHT,FAST,SLOW
61Ø DATA"BR6ØBD48R8E4U1ØR4U6L4U6
H4L16G4D6L4D6R4D1ØF4R8BU6NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BU16R6E2H2L
2ØG2F2R12BD2ØBL2ØH16D16F16R36E16
U16G16"
615 DATA AN ANGEL IS SOMEONE WHO
 IS *
62Ø DATA GOOD,BAD,RICH,POOR
625 DATA"BR6ØBD48R8E4U1ØR4U6L4U6
H4L16G4D6L4D6R4D1ØF4R8BU1ØNG4NF4
BU4NLNR2BU6BL4NR2BR6R2BU12E6D8L2
ØU8F6BL2ØD6G4L6NU1ØND2ØL6H4U6BR7
8NG4NF4D2ØG1Ø"
63Ø DATA A DEVIL IS SOMEONE WHO
IS *
635 DATA BAD,GOOD,RICH,POOR
64Ø DATA"BR2ØBD16D3ØNR56U3ØR6U16
R1ØF4G4L1ØD8R1ØD6R1ØD6R1ØD6R1ØD6
R1ØD6R26BU42BL3ØL2ØNE4NF4"
645 DATA THIS LITTLE FLAG IS * U
P
65Ø DATA HIGH,LOW,WINDY,SUNNY
655 DATA"BR2ØBD16D3ØNR56U3ØR16D6
R1ØD6R1ØD6R1ØD6R1ØD6R26L16U16R1Ø
F4G4L1ØD8BU26BR6NU16NH4NE4"
66Ø DATA THIS LITTLE FLAG IS MUC
H *
665 DATA LOWER,HIGHER,WINDY,SUNN
Y
67Ø DATA"BR32BD26NR5ØD2NR5ØD2R5Ø
D6L2D4R14U4L2U12H2U4H2U2H4L6D2F2
D2F2D8"
675 DATA A HAMMER IS SOMETHING *
68Ø DATA HARD,SOFT,LIGHT,DARK
685 DATA"BR36BD18H8U8R8F8E4R2ØF4
E8R8D8G8D1ØG4D2G8L2G4L8H4L2H8U2H
4U1ØBR1ØBD4R4NU2ND2NR4NE2NH2BR12
R4NU2ND2NR4NE2NH2BG8BD4NE4NH4D6N
F4NG4U6BR6NR2ØBL12NL2ØBR6D4BF4NF
1ØBH4BG4G1Ø"
69Ø DATA A CAT IS SOMETHING *
695 DATA SOFT,HARD,HEAVY,DARK
7ØØ DATA"BR3ØBD2D1ØNR3ØD4NR3ØL2D
4L2D4L2D4L2D12NR88D6R8NU6R8NU6R8
NU6R8NU6R8NU6R8NU6R8NU6R8NU6R8NU
6R8NU6R8U6U4H4M-1Ø,-4L4ND1ØM-3Ø,
-1ØNU16NE6D4M+3Ø,+1ØBL58ND8NH8"
7Ø5 DATA THIS FOOT HAS A SHOE *
71Ø DATA ON,OFF,LEFT,RIGHT
715 DATA"BR26BD2D14L2D4L2D4L2D4L
2D12F6R2ØE2R3ØF2R14E2F2R1ØE2U6H2
L1ØH2L8M-3Ø,-1ØH4U18BL18BD2ØG4D4
F4"
72Ø DATA THIS FOOT HAS A SHOE *
725 DATA OFF,ON,LEFT,RIGHT
73Ø DATA"BR2ØBD6ND2ØR8ØG1ØNL5ØM+
1Ø,+3ØG4L62H4M+1Ø,-3ØH4L8D14L6"
735 DATA THE PITCHER SHOWN IN *
74Ø DATA FULL,EMPTY,HOT,COLD
745 DATA"BR2ØBD6ND2ØR8ØG1ØM+1Ø,+
3ØG4L62H4M+1Ø,-3ØH4L8D14L6"
75Ø DATA THE PITCHER SHOWN IN *
755 DATA EMPTY,FULL,HOT,COLD
```

```
76Ø DATA"BR5ØBD14ND2ØR12D1ØNL12N
D1ØBR8R6NU6ND6R6BR1ØU18L6ØD36R6Ø
U18"
765 DATA THIS GRADE IS THE *
77Ø DATA BEST,WORST,LONGEST,SHOR
TEST
775 DATA"BR5ØBD14ND2ØR12BD1ØNL12
BR8R12BR1ØU18L6ØD36R6ØU18BD3Ø"
78Ø DATA THIS GRADE IS THE *
785 DATA WORST,BEST,LONGEST,SHOR
TEST
79Ø DATA"BR3ØBD4ND6R6ØD6NL6ØD4L6
ØNU4G4D28F4R6ØE4U28H4BL2ØBD32H4L
4U2NR4D2L4NUND4L4U2L4D2R4NH6L2G4
"
795 DATA THIS SHOWS A BUG * THE
JAR
8ØØ DATA INSIDE,OUTSIDE,OVER,UND
ER
8Ø5 DATA"BR12BD4ND6R6ØD6NL6ØD4L6
ØNU4G4D28F4R6ØE4U28H4BR36BD32H4L
4U2NR4D2L4NUND4L4U2L4D2R4NH6L2G4
"
81Ø DATA THIS SHOWS A BUG * THE
JAR
815 DATA OUTSIDE,INSIDE,OVER,UND
ER
82Ø DATA"BR16BD3ØNR3ØU2NR3ØU2R18
BR4R2BR4R2BL3ØU2R9ØG12M-48,+4U1Ø
"
825 DATA THIS CARVING KNIFE IS *
83Ø DATA SHARP,DULL,SOFT,HARD
835 DATA"BR16BD3ØNR4ØH2U4E2R4ØND
8R48F2D2G2L2G2L2G2L36H2"
84Ø DATA THIS BUTTER KNIFE IS *
845 DATA DULL,SHARP,SOFT,HARD
85Ø DATA"BR22BD6R3ØD6F4R8E4U6R3Ø
D16L8NU16L8D26L22NU3ØL22U26L8NU1
6L8U16"
855 DATA THIS NEW SHIRT IS *
86Ø DATA CLEAN,DIRTY,WET,HEAVY
865 DATA"BR22BD6R3ØD6F4R8E4U6R3Ø
D16L8NU16L8D26L8NU12L4NU2ØL2NU8L
4NU6L4NU3ØL8NU12L4NU2ØL2NU8L4NU6
L2NU18L2U26L8NU16L8U16"
87Ø DATA THIS OLD SHIRT IS VERY
*
875 DATA DIRTY,CLEAN,WET,HEAVY
88Ø DATA"BR2ØBD3ØNR84"
885 DATA THE SURFACE OF THIS LIN
E IS *
89Ø DATA SMOOTH,ROUGH,WET,DRY
895 DATA"BR14BD3ØBRE4R4F4R4E4R4F
4R4E4R4F4R4E4R4F4R4E4R4F4R4E4R4F
4"
9ØØ DATA THE SURFACE OF THIS LIN
E IS *
9Ø5 DATA SMOOTH,ROUGH,WET,DRY
91Ø DATA"BR24BD1ØR2ØF1ØL2ØNH1ØR6
ØM+2Ø,+8BL2ØNL6ØBR2ØM-2Ø,+8L6ØG1
ØR2ØE1ØL2ØU16BL8NL16BD4NL16BD4NL
16BD4NL16BD4NL16"
915 DATA THIS BIG ROCKET IS VERY
 *
92Ø DATA FAST,SLOW,THICK,DRY
925 DATA"BR42BD44NR3ØH1ØU1ØE1ØR2
ØF8D1ØG4L16H6U4E4R8F4D2G2L4H2BD8
R16E6R6NE6F4D4NL4G4L6BU8BR4R"
93Ø DATA THIS LITTLE SNAIL IS VE
RY *
935 DATA SLOW,FAST,THICK,DRY
94Ø DATA"BR32BD4R6ØD46L6ØU46BF2R
1ØNF4R18ND6R18NG4R1ØD5NG4D16NL6D
16NH4D5L1ØNH4L18NU6L18NE4L1ØU5NE
4U16NR6U16NF4U5BD23BR28F8U2H8NU2
M-18,-4"
945 DATA THE TIME SHOWN IS * THE
 HOUR
95Ø DATA BEFORE,AFTER,AROUND,UND
ER
955 DATA"BR32BD4R6ØD46L6ØU46BF2R
1ØNF4R18ND6R18NG4R1ØD5NG4D16NL6D
16NH4D5L1ØNH4L18NU6L18NE4L1ØU5NE
4U16NR6U16NF4U5BD23BR28F8U2H8NU2
M+18,-4"
96Ø DATA THE TIME SHOWN IS * THE
 HOUR
965 DATA AFTER,BEFORE,AROUND,UND
ER
```


VIP WRITER

VIP Writer

RATED "BEST" IN SEPT '88 "RAINBOW"

VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed is not supported, Spooler is unavailable. Hard disk is not supported. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2!

VIP Writer includes VIP Speller AT NO ADDITIONAL COST. **DISK $69.95**

VIP Database

"ONE OF THE BEST" JULY 1984 "RAINBOW"

VIP DATABASE

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed is not supported, Spooler is unavailable. Even so, VIP Database is the most complete database for the CoCo 1 & 2! **DISK $49.95**

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```
97Ø DATA"BF3ØE8R2E2NH6R2E2R4E2NH
6R6E2R6NH6R4F2R6F2R4NH8F2R2F2R2F
8H2L2G2L2G2L4G2L6G2L2ØH2L6H2L4H2
L2H2NL2F2R2F2R4F2R6H4U2H2U4E2BR3
ØF2D4G2D2G4BU4BL1ØU8F2D4L4U6D8H2
U4"
975 DATA THIS EYE LOOKS LIKE IT
IS *
98Ø DATA AWAKE,ASLEEP,LISTENING,
TALKING
985 DATA"BF24BR4F2R2F2NG6R2F2R6F
2NG6F2R8NG6R8E2R6NG8E2R4E2R2E2R2
NG1ØE2BU2ØBL7ØR1ØG1ØR1ØBR6RBR6RB
R6NR1ØE1ØNL1ØBD1ØBR6RBR6RBR6NR1Ø
E1ØNL1ØBD1ØBR6RBR6R"
99Ø DATA THIS EYE LOOKS LIKE IT
IS *
995 DATA ASLEEP,AWAKE,LISTENING,
TALKING
1ØØØ DATA"BD6BF38R8E4U1ØR4U6L4U6
H4L16G4D6L4D6R4D1ØF4R8BU6NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BR4ØBD2ØR8E
4U1ØR4U6L4U6H4L16G4D6L4D6R4D1ØF4
R8BU6NE4NH4BU8NLNR2BU6BL4NR2BR6R
2"
1ØØ5 DATA THIS PERSON IS * A FRI
END
1Ø1Ø DATA WITH,WITHOUT,HAPPY,SAD
1Ø15 DATA"BR6ØBD44R8E4U1ØR4U6L4U
6H4L16G4D6L4D6R4D1ØF4R8BU6NE4NH4
BU8NLNR2BU6BL4NR2BR6R2"
1Ø2Ø DATA THIS PERSON IS * A FRI
END
1Ø25 DATA WITH,WITHOUT,HAPPY,SAD
1Ø3Ø DATA"BR6ØBD5ØR8E4U1ØR4U6L4U
6H4L16G4D6L4D6R4D1ØF4R8BU6NE4NH4
BU8NLNR2BU6BL4NR2BR6R2BU12NL12R4
U2NL16U2NL3ØR14L2D8NF2NG2"
1Ø35 DATA THIS IS SOMEONE WHO IS
 VERY *
1Ø4Ø DATA WISE,FOOLISH,STRONG,WE
AK
1Ø45 DATA"BR6ØBD5ØR8E4U1ØR4U6L4U
6H4L16G4D6L4D6R4D1ØF4R8BU1ØNG4NF
4BU4NLNR2BU6BL4NR2BR6R2BU1ØR6M-1
Ø,-2ØM-1Ø,+2Ø"
1Ø5Ø DATA THIS IS SOMEONE WHO IS
 VERY *
1Ø55 DATA FOOLISH,WISE,STRONG,WE
AK
1Ø6Ø DATA"BRBD26BR24R76M-3Ø,-1ØL
4G4L4H4L4M-3Ø,+1ØD2M+3Ø,+6R4E2R8
F2R4M+3Ø,-6"
1Ø65 DATA THIS IS PART OF A * FA
CE
1Ø7Ø DATA PRETTY,UGLY,FAT,THIN
1Ø75 DATA"BD22BR2ØNE4NG4R76NH4NF
4G12L52H12F6R1ØNU6ND6R1ØNU6ND6R2
NU6R2NU6R2NU6R2NU6ND6R1ØNU6ND6R2
ND6R2ND6R2ND6R2ND6NU6R1ØNU6ND6R6
"
1Ø8Ø DATA THIS IS PART OF AN * F
ACE
1Ø85 DATA UGLY,PRETTY,FAT,THIN
1Ø9Ø DATA"BR16BD2ØR8ØM-4,+2ØL36M
-4,-18NL36E4R36H2L32R12U4R8D4BD4
2"
1Ø95 DATA THIS IS A PAN WHICH IS
 *
11ØØ DATA COVERED,UNCOVERED,HOT,
COLD
11Ø5 DATA"BR16BD2ØR8ØM-4,+2ØL36M
-4,-18NL36BU8BE4R36H2L32R12U4R8D
4"
111Ø DATA THIS IS A PAN WHICH IS
 *
1115 DATA UNCOVERED,COVERED,HOT,
COLD
112Ø DATA"BD2BR56F12D4G2L4D2F2D2
M-16,+4M+12,+3F2D2G4D4G2L14G2D4B
E2ØBR12NR26BD4M+2Ø,+6BU2ØM-2Ø,+6
BH18L4F2"
1125 DATA THIS SHOWS SOMEONE *
113Ø DATA TALKING,LISTENING,SEEI
NG,FEELING
1135 DATA"BD18BR94U4H4L4NU8L8G4D
2G2D12F2DF8R4ND6R6E4BH6L4H2U4BL2
8BD2ØE2R2E2U4E2U2ØH2U4H2L2H2BL12
BD34E2R2E2U4E2U1ØH2U4H2L2H2BL12B
D28E2R2E2U4E2U4H2U4H2L2H2BL12BD4
NF6D14L6F2L2"
114Ø DATA THIS SHOWS SOMEONE *
1145 DATA LISTENING,TALKING,SEEI
NG,FEELING
115Ø DATA"BR3ØBD8NE4NU8NH4BL8D1Ø
NR6ØD2ØNR6ØD1ØR6ØBR6F4H2G2E4BR6U
2ØNL6ØU2ØL6Ø"
1155 DATA THE MARK IS AT THE *
116Ø DATA START,FINISH,SIDE,MIDD
LE
1165 DATA"BR2ØBD8D1ØNR6ØD2ØNR6ØD
1ØR6ØBR6F4H2G2E4BR6U2ØNL6ØU2ØNL6
ØD4ØBR6NE4NR8NF4"
117Ø DATA THE MARK IS AT THE *
1175 DATA FINISH,START,SIDE,MIDD
LE
118Ø DATA"BR44BD4R6F4R2E4R2F4R2E
4R6G8L2ØNH8D4R2ØNU4F12D14G6L3ØH6
U14E12BF6BD4NR8L4D6R12D6L12R6ND4
NU16"
1185 DATA THIS MEANS SOMEONE IS
*
119Ø DATA RICH,POOR,TALL,SHORT
1195 DATA"BR58BD6R6F2R2F2R2F4R2F
4D4F2D6G2D4G4L2G4L2G2L2G2L12H2L2
H2L2H4L2H4U4H2U6E2U4E4R2E4R2E2R2
E2R4BD12BL2NG4D16L4R8BR8BU4U4R2L
6U4R6L2U4"
12ØØ DATA SOMEONE WITH JUST THIS
 IS *
12Ø5 DATA POOR,RICH,TALL,SHORT
121Ø DATA"BR36BD2ØR5ØD3ØL5ØU3ØBF
6ND16BR4ND16BR4ND16BR4ND16BR4ND1
6BR4ND16BR4D16BD4NL24BR8BU4R4U2L
```

```
4U2R4BU6L4U2R4U2L4BR32BU18M-14,+
6BL12NE8BL1ØNE8BL1ØNU8BL1ØNH8BL1
2NH8BL12M-14,-6"
1215 DATA THIS RADIO IS VERY *
122Ø DATA NOISY,QUIET,BRIGHT,DAR
K
1225 DATA"BD2BR36F12D4G2L4D2F2D2
G4NL1ØF2D2G4D4G2L14G2D4BR28U24E4
R2F4D1ØE2R2F2E2R2F2E2R2F2D1ØG4BU
2ØBL8R6U4L6U4R6BR6D8U4R8U4D8BR6U
8D4R8U4D8BR4R2BR4R2BU2ØBL8ØL6"
123Ø DATA THIS MEANS TO BE *
1235 DATA QUIET,NOISY,BRIGHT,DAR
K
124Ø DATA"BR4ØBD2R44F4D2M-8,+2ØG
8L4D4F4NL2ØD6L2ØU6E4U4L4H8M-8,-2
ØU2E4BD4BR2G2M+6,+16R2U18NL4BR28
D18R2M+6,-16H2L4BL22BD4NG2D16NL2
R2BR2BU6R4U4L4U4R4BR4R2ND8R2"
1245 DATA THIS IS A SIGN OF *
125Ø DATA WINNING,LOSING,SLEEPIN
G,READING
1255 DATA"BR34BD16R6U4L6U4R6BR4N
R6D8R6BR4U8R6D8NL6BR4U8R6D4L6R2F
4BR4NR6U4NR6U4R6BD2ØBL5ØD1ØR1ØU1
ØNL1ØBR6BD4R6BR1ØBD6R4NR4U1ØNG4B
R1ØD1ØR1ØU1ØL1ØBF18L74U44R74D44"
126Ø DATA THIS IS A SIGN OF *
1265 DATA LOSING,WINNING,SLEEPIN
G,READING
127Ø DATA"BR62BD36R8E4U1ØR4U6L4U
6H4L16G4D6L4D6R4D1ØF4R8BU1ØNG4NF
4BU4NLNR2BU6BL4NR2BR6R2BD1ØBF8M-
12,+18M-12,-18BU24BR38D3ØR4U3ØL4
U6R12D2R8F6D4L4H4L6U2L1ØBL5ØBD8L
22D2NR22R2D4F6G6D4L2NR22D2R22U2L
2U4H6E6U4"
1275 DATA THIS IS SOMEONE WHO IS
 *
128Ø DATA OLD,YOUNG,TALL,SHORT
1285 DATA"BR6ØBD44R8E4U8R4U6L4U6
H4L16G4D6L4D6R4D8F4R8BU6NE4NH4BU
8NLNR2BU6BL4NR2BR6R2BU8U2H2L4BR2
6BD6R1ØD2ØL1ØU2ØE2R6L2U2L2BL58BD
4L2G2D4F2R2D1ØG2D2F2E2U2H2U1ØR2E
2U4H2L2"
129Ø DATA THIS IS SOMEONE WHO IS
 *
1295 DATA YOUNG,OLD,TALL,SHORT
13ØØ DATA"BR18BD4R6ØD46L6ØU46BF2
R1ØNF4R18ND4R18NG4R1ØD5NG4D16NL6
D16NH4D5L1ØNH4L18NU6L18NE4L1ØU5N
E4U16NR6U16NF4U5BD23BR28F8U2H8NU
2U12BR4ØND8R12D4NL12D4BD8ND8G6H6
D8"
13Ø5 DATA THIS TIME IS VERY *
131Ø DATA EARLY,LATE,LONG,SHORT
1315 DATA"BR18BD4R6ØD46L6ØU46BF2
R1ØNF4R18ND4R18NG4R1ØD5NG4D16NL6
D16NH4D5L1ØNH4L18NU6L18NE4L1ØU5N
```


MJK & MJK3 DOS

RAINBOW CERTIFICATION SEAL

WHY BUY ADOS 3
WHEN YOU CAN HAVE THIS

Now: MJK-DOS for COCO 1, 2, and 3 $39.95
Most powerfull operating system for the CoCo ever! Allows up to 3 DS-80 track driver or standard drives. The DS-80 drives are software configurable to standard Radio Shack* format in order to maintain compatibility. Allows global file name specification with wildcards. All the files will be dirplayed alphabetically, including the date that the file was saved. Use one command to KILL or COPY a number of files that meet the global filename specification (can be a full disk) in one run or one at a time upon user prompt (Y-key). Use the powerfull CHAIN command to use programs of any length. Use the built in FULL SCREEN EDITOR to allow fast and easy program modification. You can even use the TRON command that will put you (after an error) in the modified line editor or get the automatic error trap routine with fully spelled out error names. Hit one key to repeat the last command. You will also get error trap, repeat key, AUTO, DATE, CAT (two columns of directory with only the filenames & extensions), WAIT, RUNM, BAUD, FIND, OLD, DATE$, (string in basic program), LCOPY (groups of basic lines), RENL (to replace a string), TYPE (list a text file on screen/printer), SPLIT or JOIN basic lines, SAY for real spoken text, word peek & poke and many more.... MJK-DOS is primarily intended for double-sided 80-track drives (720K each)
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CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a phrase compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with. Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). When even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics *H/GET, H/Put, H/Play and H/DRAW*, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximately 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- Ou Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even during disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily babed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexibility and exclusive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with exclusive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time consuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts. Like a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpi.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
- Automatically locates Begin, End and Execution address.
- Output Disassembled listing with labels to the Printer, Screen or both.
- Generates Assembler source files directly to disk or printer.
- Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
- Menu display with single key commands for smooth, Easy operation.
- Written in Ultra Fast Machine Language.

Requires 128K & Disk $49.95

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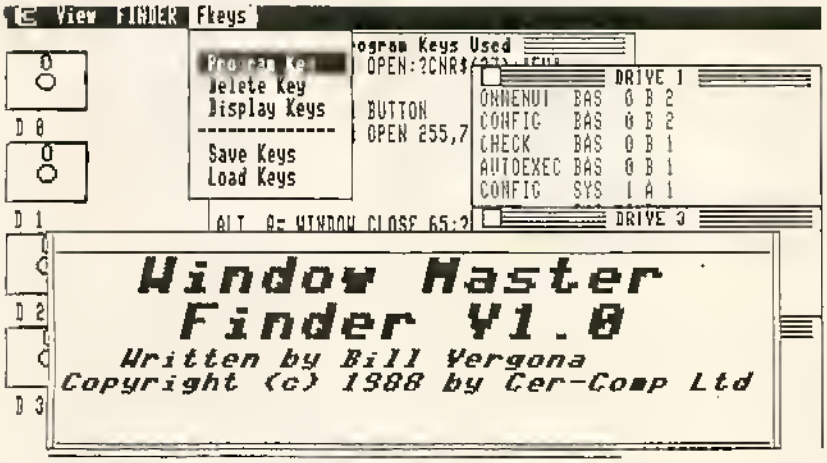
"Window Master"



Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occured.

Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line, toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

Window Master Features

Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

Pull Down Menus

Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.

Window Master Applications

Window Master pushs the Color Computer 3 far beyond its normal capabilities, into the world of a "User Friendly" operating enviornment. We are already planning several new programs for use with Window Master. So you don't have to worry about having to write all your own programs. And don't forget that many existing Basic and M.L. programs will run under Window Master with little or no changes. The Possibilities for Application programs are endless: Spread Sheets, Word Processing, Communications, Education, Games, Graphic Design, Desk Top Publishing and on and on.

Hardware Requirements

Window Master requires 512K of memory, at least 1 Disk Drive, a Hi-Res Joystick Interface and a Mouse or Joystick.

Technical Assistance

If you run into difficulty trying to use some of Window Master's features, we will be happy to assist you in any way possible. You can write to us at the address below or call us between 10am and 2pm Pacific Standard Time for a more timely response. Sorry, no collect calls will be accepted.

Ordering Information

To order WINDOW MASTER by mail, send check or money order for $69.95, plus $3.00 for shipping & handling to the address below. To order by VISA, MASTERCARD or COD call us at (702)-452-0632
(Monday thru Saturday, 8am to 5pm PST)

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```
E4U16NR6U16NF4U5BD23BR28H8U2F8NU
2U12BR4ØND8R12D4NL12BD4BD8ND8G6H
6D8"
132Ø DATA THIS TIME IS VERY *
1325 DATA LATE,EARLY,LONG,SHORT
133Ø DATA"BR12BD4ØR1ØØL14BU2E2NR
6U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF
2L1ØU4R4U2E6R2ØF4R1ØD8NR2BL54L4N
G2U2H2L2G2D2NF2L14NG2U2H2L2G2D2N
F2L1ØU2ØR28D6R6D6R8ND8BE22D8NE4N
H4"
1335 DATA YOUR CAR IS * THE TRUC
K
134Ø DATA IN FRONT OF,BEHIND,BES
IDE,UNDER
1345 DATA"BR12BD4ØR98L8BU4NG2U2H
2L2G2D2NF2L14NG2U2H2L2G2D2NF2L1Ø
U2ØR28D6R6D6R8D8L4BL56BD2E2NR6U2
H2L2G2D2NF2L14NG2U2H2L2G2D2NF2L1
ØU4R4U2E6R2ØF4R1ØD8NR2BH22NU8NH4
NE4"
135Ø DATA YOUR CAR IS * THE TRUC
K
1355 DATA BEHIND,IN FRONT OF,BES
IDE,UNDER
136Ø DATA"BR12BD4ØR1ØØL64BU2E2NR
6U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF
2L1ØU4R4U2E6R2ØF4R1ØD8R2BD4R8U24
NG4U4NR44L8E12NR4ØBG16BL12NL14NH
4NG4"
1365 DATA THE CAR WILL * THE GAR
AGE
137Ø DATA ENTER,EXIT,SURROUND,HI
T
1375 DATA"BR12BD4ØR1ØØL14BU2E2NR
6U2H2L2G2D2NF2L14NG2U2H2L2G2D2NF
2L1ØU4R4U2E6R2ØF4R1ØD8NR2BD4L52U
24NF4U4NL44R8H12NL4ØBF16BR12R14N
H4NG4"
138Ø DATA WATCH THE CAR * THE GA
RAGE
1385 DATA EXIT,ENTER,SURROUND,HI
T
139Ø DATA"BR3ØBD24ND1ØF1ØM+28,-8
R1ØF1ØG4NL1ØG6L1ØM-28,-8G1ØU1ØU2
BR36NH4NG4BR1ØBU4R2BR12R2BU6R2BU
6R2BU6R2BU1ØBR4NF4G4L8H4G4L8H4G4
L8H4G4L8H4G4L8H4G4"
1395 DATA THIS FISH IS *
14ØØ DATA ALIVE,DEAD,TASTY,AWFUL
14Ø5 DATA"BR3ØBD24ND2ØF1ØNG1ØR6N
U4ND4R6NU6ND6R6NU8ND8R6NU8ND8R6N
U8ND8R6ND8U8R4F8G4NL4G4L4BU22BL1
ØE2U2H2U2E2U2H2U2BL12D2F2D2G2D2F
2D2G2"
141Ø DATA THIS FISH IS *
1415 DATA DEAD,ALIVE,TASTY,AWFUL
142Ø DATA"BR34BD34NU8R6NU8R6NU8B
R6U8R8D4NL8D4BR6NU8R8BR6U8D4R4NE
4F4BR6ND4U12L68D16NR68U18R68U2L6
8U2R68U2L68U2R68U2L68U2R68U2NL68
L28NU6L1ØNU6BD32ND6BR1ØND6"
1425 DATA THIS SIGN TELLS YOU TO
 *
143Ø DATA GO,STOP,LISTEN,TALK
1435 DATA"BR34BD34NU8R6NU8R6NU8B
R6U8R8D4NL8D4BR6NU8R8BR6U8D4R4NE
4F4BR6ND4U12L68D16NR68U32R68ND32
L28NU6L1ØNU6BD32ND6BR1ØND6BU2ØBL
34R2NU8R8U8NL1ØBR6ND8R8D8NL8BR6U
8F8U8BR6R2ND2BR4R4ND8R4"
144Ø DATA THIS SIGN TELLS YOU TO
 *
1445 DATA STOP,GO,LISTEN,TALK
145Ø DATA"BR22BD16NR68M+4,+1ØF16
G6R4ØH6E16M+4,-1ØBD1ØBR6R1ØF4D6G
1ØM-1Ø,+3L1ØE6R1ØE6U2H2L4U4BU1ØB
L3ØG6D4NF4G8"
1455 DATA THIS CUP IS *
146Ø DATA BROKEN,FIXED,HEAVY,LIG
HT
1465 DATA"BR22BD16NR68M+4,+1ØF16
G6R4ØH6E16M+4,-1ØR1ØF4D6G1ØM-1Ø,
+3L1ØE6R1ØE6U2H2L4"
147Ø DATA THIS CUP IS *
1475 DATA FIXED,BROKEN,HEAVY,LIG
HT
148Ø DATA"BR3ØBD42R5ØE4U6M-6,-16
E2U4H4L12G2D6F2R4NE2D1ØH2L2H2L4H
2L6G2L4G2L2G2L4BU1ØR12U2L12U2R12
NR16U2NR16L12U2R12U2L12BR6ØR12D2
L12D2NL16R12D2L12NL16D2R12D2L12"
1485 DATA THIS SHOWS A * ARM
149Ø DATA STRONG,WEAK,HEAVY,LIGH
T
1495 DATA"BR3ØBD42R12D2R1ØD2R6U2
R1ØU2R12E4U6M-6,-16E2U4H4L12G2D6
F2R4NE2D12L34BU16NR26NU4ND2U2R26
BR22R22NU2ND4D2L22"
15ØØ DATA THIS SHOWS A * ARM
15Ø5 DATA WEAK,STRONG,HEAVY,LIGH
T
151Ø CLS:PRINT@1Ø1,"YOU TRIED"NC
+NW"TIMES &":PRINT@165,"ANSWERED
"NC"CORRECTLY"
1515 PRINT@229,"WHILE DOING"NW"W
RONG."
152Ø NQ=NC+NW:IF NQ=ØTHEN NQ=1
1525 MS=INT(NC/NQ*1ØØ)
153Ø PRINT@293,"YOUR SCORE IS"MS
"%."
1535 PRINT@357,"ANOTHER TRY (Y/N
/C) ?";
154Ø X$=INKEY$:IFX$="Y"THEN RUN
1545 IFX$="N"THENCLS:END
155Ø IFX$="C"THEN156Ø
1555 GOTO154Ø
156Ø IF FF=1 THEN RUN
1565 IFV=1THENSCREEN1,1:GOTO29Ø
157Ø IFV=ØTHENSCREEN1,1:GOTO245
```

Finally, a beginner's project that does something

A Simple, Expandable LED Project

By Tony DiStefano
Rainbow Contributing Editor

Ever notice that my articles run in patterns? Usually, I start with a simple project for the beginner, move on to a harder, longer project and then finish with an electronic lesson. Well, it's time, once again, for a beginner's project. It is always hard to design a simple project that actually does something. As an electronics student in college, I did a lot of labs. They were simple, but they were *boring*. (Set the power supply to 10 volts. Put two resistors in series. Measure the voltage across the two resistors. Compare the values to that of the calculated voltage values.) Those labs were enough to put you to sleep in the middle of a lab.

For this column, I had to design a project that is simple but not boring. I checked to see what beginners wanted as a starter project. Most said they wanted something that worked in front of them — something that buzzed, beeped, moved or lit up. In the past, I have had projects using an LED to indicate that power is on, the disk drive is on, etc. LEDs are always a good project, and this beginner's project makes the computer control up to eight LEDs. (Note: Even though this project is for beginners, some electronics knowledge is required. Read the article and judge for yourself if you understand enough of it to try it.)

I will continue this project for a few months and make it grow into a miniature control center. This project will show the beginner how to turn on LEDs, small motors, relays, sensor devices, etc. If you come up with a few ideas, let me know. You can write to me in care of THE RAINBOW or reach me on Delphi.

As with any project, you need tools. How far you want to go with this project will determine how many tools and parts you will need. To begin the project, you will need the following parts:

Part #	Description
U1	74LS273
C1	.1uf 10 volts
R1 to R8	470 ohm ¼ watt
D1 to D8	LED (just about any kind)
Misc.:	20-pin socket and wire.

You may already have some of these materials, and most are available at your local Radio Shack. You may need to get some parts through a mail order service. Many companies that have the parts advertise in RAINBOW.

The first thing you need is a project board. Radio Shack has dropped this item. I suggest you check RAINBOW's advertisements to find a board. I get my boards through CRC, but the board is available through other companies. At this time, the only tools you will need are a soldering iron and some solder.

It should take less than two hours to assemble this project. We will do it together, step by step. Don't start until you have all the parts. It's no fun to let a project sit, incomplete, because some of the parts are missing.

Before we begin, it is important to

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

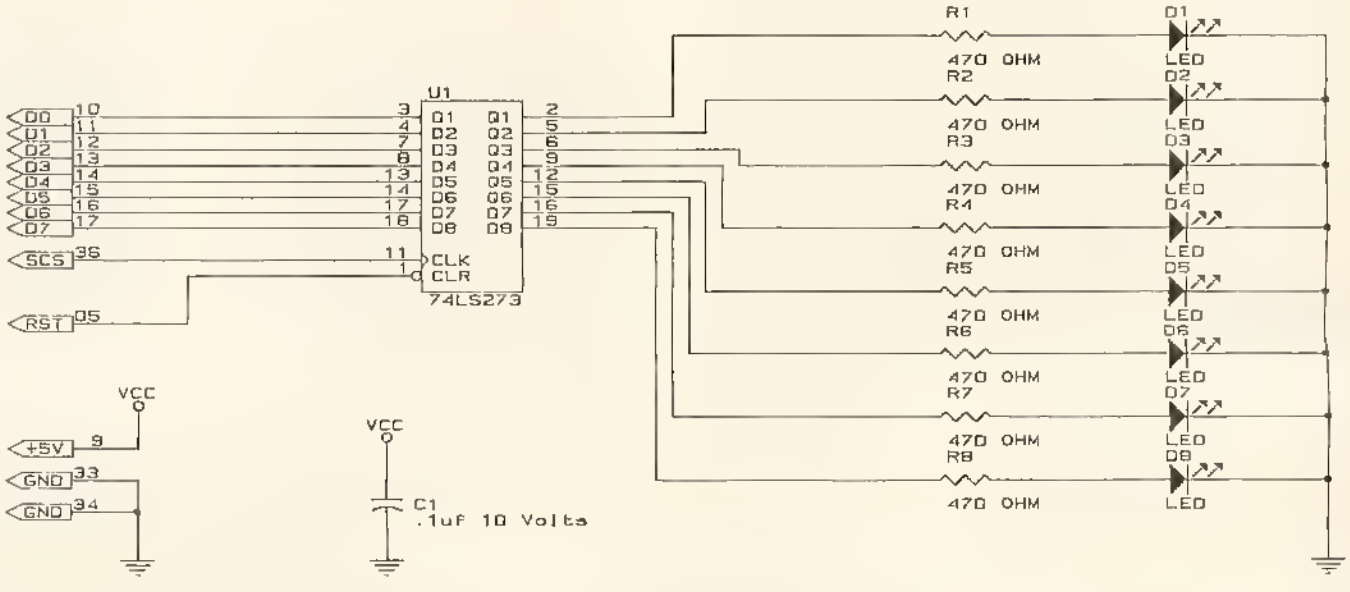

Figure 1

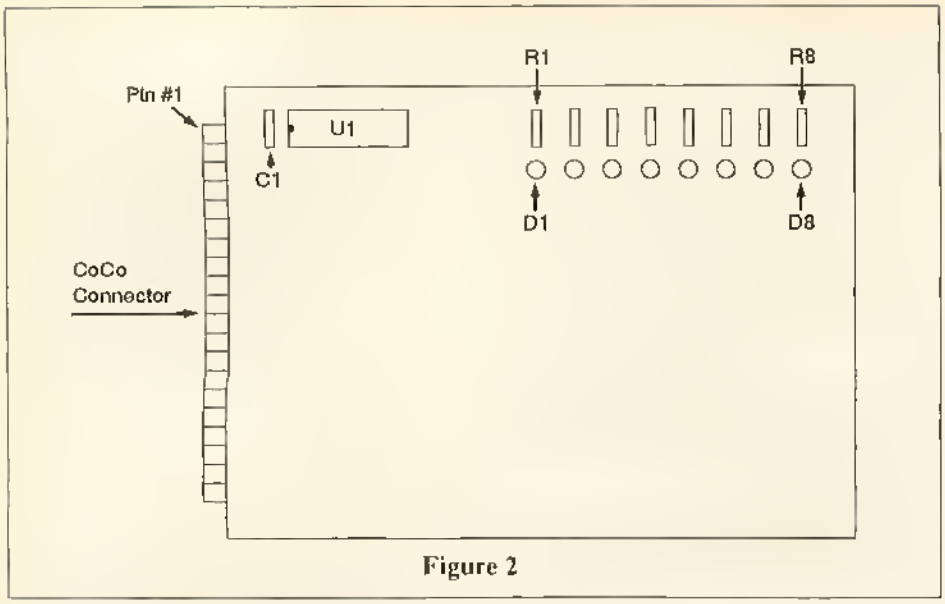

Figure 2

understand how a schematic diagram works. Look at Figure 1, and examine U1. The pin numbers are not drawn in any order. They are arranged so the diagram is easy to understand. All the inputs are one side, and all the outputs are on the other.

On the actual board, the pins are arranged in order. Begin with Pin 1, which is identified by a notch or dimple. The next pin in a counter-clockwise direction is Pin 2. The other pins are in the same counter-clockwise order. The boxes on the left of Figure 1 are the pin descriptions for the CoCo's pin connector. The numbers above the wires are the pin numbers. Pin +5V leads to a box labeled VCC. That means every point in the diagram hooked up to VCC is really hooked up to that pin. This also applies to Box GND. All points marked GND are connected.

While it is not obvious on this small diagram, the way the diagram is presented makes the schematic easier to read. Instead of wires everywhere, labels are used. (Please note: Though not marked on the diagram, U1 has a VCC at Pin 20 and a GND at Pin 10.

Now, let us begin the project.

First, put all the parts on a clean table. If you are using a CRC project board, make sure you have the right side up. A small #1 is printed next to Pin 1. This is the top. Pin 2 is directly below Pin 1, Pin 3 is next to Pin 1, Pin 4 is below Pin 3 and next to Pin 2, etc. All parts will mount on the top.

Mount the 20-pin socket in the top of the protoboard. For proper placement, follow the plan in Figure 2. Make sure that Pin 1 is the pin closest to the edge connectors. Solder all the pins of the socket, and mount the resistors and LEDs. Make sure that the short lead of the LED is positioned away from the resistors. They are polarized, and the short lead is the negative side. Bend the leads so that no part falls out. Insert the capacitor next to the socket, and bend the leads of this part as well.

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The rest is just wiring. You know the pin numbers and positions. One at a time, solder a wire between the points in the schematic. Every time you place a wire, mark it off on the diagram. This serves two purposes: that you don't miss any points and that you don't try to do any point twice.

Let's do the first few together. Following the schematic, solder one end of the wire to Pin 10 on the connector. Cut the wire so that it just reaches Pin 3 of U1, and solder that end of the wire to Pin 3 of U1. Mark off this wire on the schematic. Next, solder an end of the wire to Pin 11 of the connector. Cut the wire so that it just reaches Pin 4 of U1, and solder that end to Pin 4. Mark off that wire on the schematic. Now finish off the rest of the wires one at a time. When you are finished, recheck all your work. Remember to check the VCC and GND of U1. Insert the 74LS273 into the socket, and make sure that Pin #1 is in the right place.

That's all there is to the hardware part of it. Plug it in, turn on your computer and check for the normal power-up message. If you do not, turn off the computer and check your work again.

Now that you have built it, let's see how it works. Look at Figure 1. The main part in this project is U1, an eight-bit D-type flip-flop. All the D's are inputs and all the Q's are outputs. When the CLK input is strobed, the binary level on D is transferred to Q. Thus, if all D's were at Level 1 when the CLK was strobed, all the Q's (outputs) are now at Level 1. The D's are now at Level 0. The CLK that I am using is the CoCo's SCS pin. It is mapped at $FF40 to $FF5F. Since I am not using any address lines, mirroring will occur throughout this area. Next month, when we expand, I'll use the address lines to add more to this project.

Since they are all connected to identical circuits when any Q has 0 volts, no current can flow because the other end of the circuit also has 0 volts (GND). The LED is off. When any Q is high, roughly three to five volts, current flows through the resistor and the LED.

Since each LED is represented by one bit on the CoCo's bus, D0 on the CoCo controls LED 1, D1 controls LED 2, etc. Since it is memory-mapped on the CoCo's bus, a simple BASIC poke command will turn on the LEDs. Thus, if you type `POKE &HFF40, 255`, all the LEDs should go on. (Wow! It works.)

If it doesn't work, check all your wiring. Did you put all the LEDs in the right direction? Try reversing one and see.

If it is working, continue by typing `POKE &HFF40, 1`. Only one LED should be on. Now try typing 2 instead of 1, then 4, 8, 16, 32, 64 and finally 128. Each LED should light up, one at a time. Now try 72 (8 + 64). Adding two LED values together will cause both LEDs to come on. Use a `FOR/NEXT` loop to write a program that makes a chaser.

Those of you with Multi-Pak Interfaces must remember that the SCS pin is switched. In order to poke the values at $FF40 in the right slot, you must change the slot access. You can do this by going into the all-RAM mode and turning the switch in front of the Multi-Pak to the project's slot. You can also make sure that your disk controller is in Slot 4, then put your project in Slot 1 and type `POKE &HFF7F, &H30`. This will change the SCS access to Slot 1 and leave the CTS, or DOS, access in Slot 4. Remember to return to &H33 before trying to access the disk.

In my next column, I'll expand this project to include more goodies that beep, boop and buzz.

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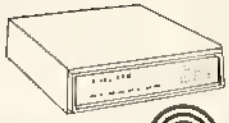

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Sorting It All Out

By William Barden, Jr.
Rainbow Contributing Editor

You wouldn't think sorting would be sueh a big deal on computers, would you? Alphabetizing a mailing list, arranging shapes in order of size, building an ordered word list — it just doesn't seem like a profound task. And yet, I'm sitting here with Knuth's *Sorting and Searching*, a 700-page book with fine print that disensses the various sorting methods. Although Knuth is a renowned computer expert, he doesn't write for the popular audienee. (In fact, I haven't seen *many* deseriptions of sorts that even an experieneed programmer would understand.)

This column will attempt to describe four typieal sorts so that average RAINBOW readers (*and* the author) ean understand them. Fortunately, we can use CoCo graphics to our advantage in this situation. The programs I'm about to describe not only *sort* data, but they *display* the data on the CoCo sereen as it is sorted. I was amazed to see just how easily the sorts ean be visualized if you can, well, *visualize* them.

A Row of 126 Sticks

Suppose that you have a row of 126 stieks of various sizes; some of the stieks may bc the same size. How do you sort them? One way is to bundle them up, stand them on a flat surface, and pick the longest stick. This stiek is then set aside, and the proeess is repeated for the next stick, and the next, ete. The process continues for all 126 stieks — 126 seleetions are made.

A computer sort ean proceed the samc way. However, the computer can't *see* all 126 stieks and piek out the longest. It must sean through all 126 sticks, and eompare eaeh new stick with one previously set aside as the longest. It's as if a friend were holding the sticks behind his baek and handing them to you one at a time. You'd compare the new stick with the longest stick you had found so far, and save the new stiek if it was longer.

A Selection Sort

The Seleetion Sort is similar to the ease of the friend holding sticks behind his back. At the end of one pass through the sticks, the Selection Sort selects the longest stiek. Let's see how it works.

Suppose that you have the 10 stieks shown in Figure 1 and want to place them in order, smallest to largest, left to right. First, assume that we have a pad and peneil on whieh we've noted the "largest stiek" and its position — one through 10. We'll begin with an imaginary stiek *smaller* than any in the pile and place it in Position –1. We will also note on the pad the last position of the row — Position 10. Moving from left to right, we will look at eaeh new stiek. If it's larger than the largest stiek we've reeorded, we make a note of its position. As we continue moving to the right, we eompare each stick to the largest stick we have found. If a new stiek is larger, *it* bceomes the largest stiek, and its position is noted on the pad. At the end of one pass, we have the position of the largest stiek. We now exehange that stick with the stiek in the last position. Position 10 now holds the largest stick.

Next, we use Position 9 as the last position and start the process again — examining the stieks in positions one through nine. At the end of this scan we have the position of the next largest stick, and we exchange this stick with the one in Position 9. Then we begin the proeess again, using Position 8 as the last position. Next we use Position 7, etc. Each time we complete the proeess, we add the next largest stick to the last position. It takes 10 passes to order the sticks from largest to smallest, left to right.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

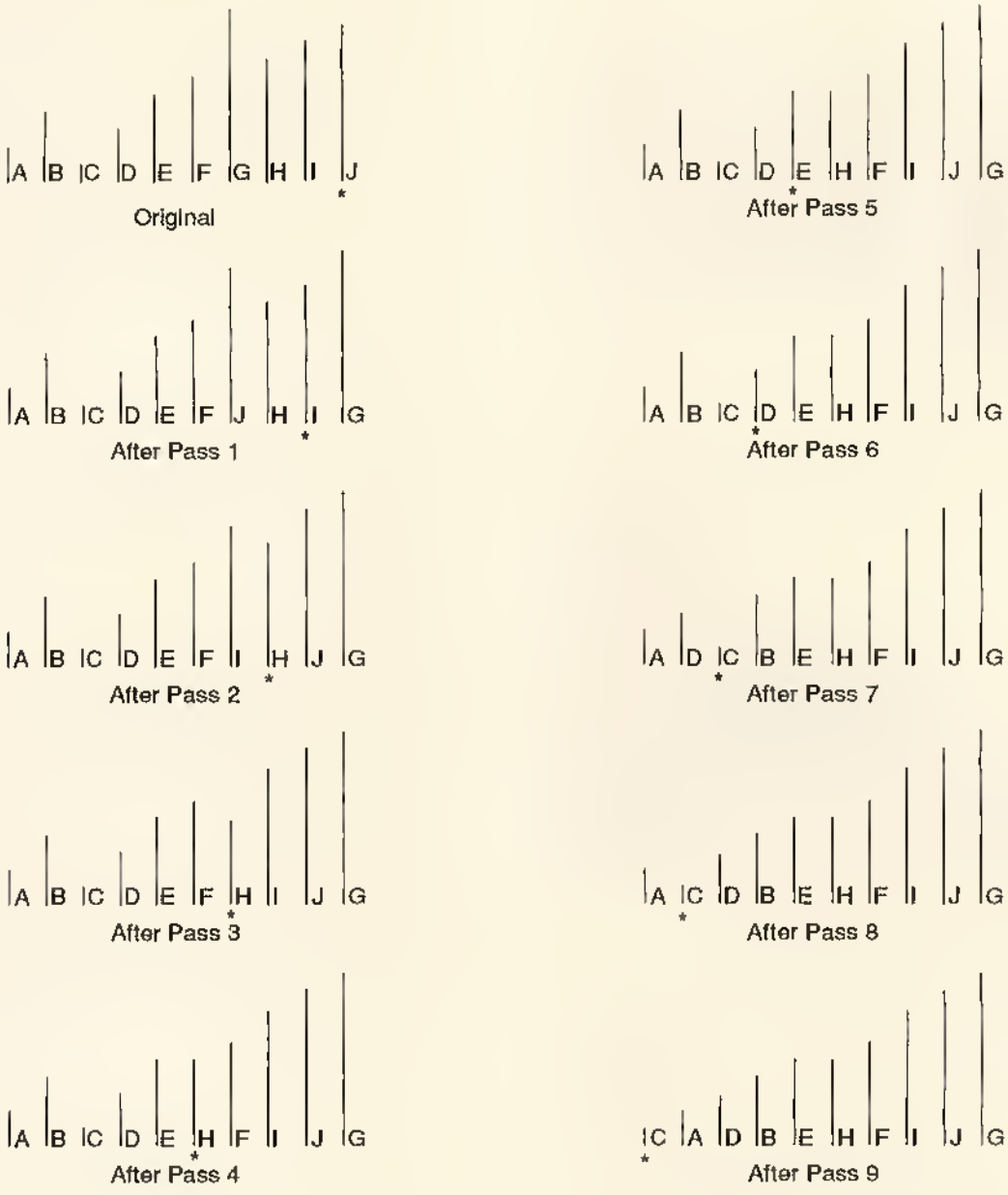

Figure 1: Selection Sort

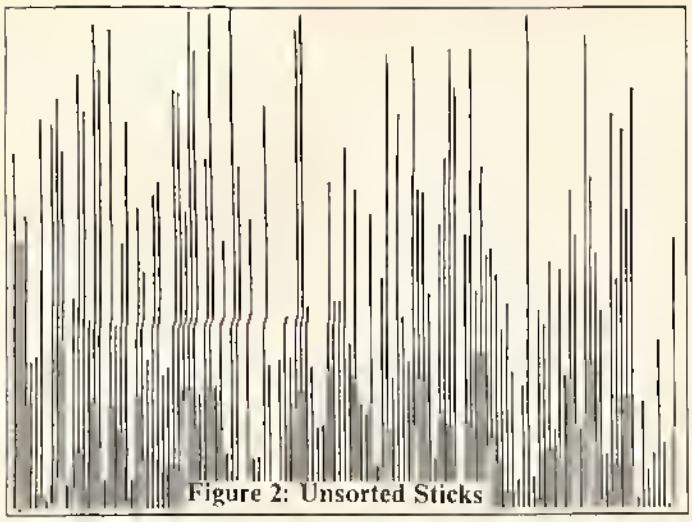

Figure 2: Unsorted Sticks

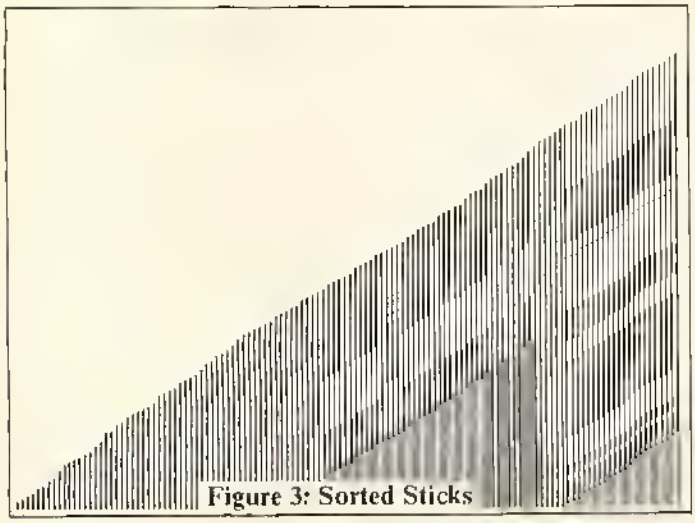

Figure 3: Sorted Sticks

A Screen Full of Sticks

We've simulated a pile of sticks on the CoCo screen, as shown in Figure 2. The BASIC LINE command has been used to generate 126 randomly-sized sticks across a 256-by-192 resolution screen. The sticks are placed in alternating columns so that you can differentiate between individual sticks and so that a border can be maintained around the screen. (We could have used any number, but 126 was convenient.)

The lengths of the sticks are stored in Array NO, a 126-entry numeric array. The values in NO correspond to the length of each stick.

Selection Sort Mechanics

The *Selection Sort* program is shown in Listing 1. The first portion generates the sticks on the screen; the middle portion is the actual sort; and the last portion displays the swapped sticks.

In the program, Variable J is the position of the last stick. It begins as Position 126 and ends as Position 1. Imagine this position changing as smaller and smaller sticks move from the rightmost to the leftmost position. As the pass progresses, Variable LS, will hold the value of the largest stick. The initial value of LS is -1. Because every stick is larger than this, it's guaranteed that there will be a new largest stick at the end of the first pass. Variable SI records the current position of the largest stick. Its initial value is also -1, an illegal value, but this will be changed to a legitimate value by the end of the first pass.

The main loop in the sort is Line 220. The stick lengths from NO(1) through NO(J) are compared to the largest stick in LS. Any stick larger than the value in LS replaces the LS value. Its position is then stored in Variable SI. At the end of the pass, SI holds the position of the largest stick — NO(I). This stick is then swapped with NO(J). The process continues as the value of J decreases by one with each pass.

(After each pass, the two line display subroutines clear the two stick lines involved and then rewrite the exchanged lines.)

Keep your eye on the largest stick while running this program. It will be swapped with the stick in the last position. You'll see progressively smaller sticks being placed from left to right as the sort is done. The result of this *sort is shown* in Figure 3. The *Selection Sort* program takes about 1½ minutes on a CoCo 2.

Bubbling Away

The Bubble Sort is another popular sort. It's similar to the Selection Sort. At the end of one pass through the sticks, the Bubble Sort selects the longest stick. However, it may also exchange other sticks, partially ordering them. Let's see how it works.

Imagine that we have the same 10 sticks shown in Figure 1 and that we still want to order the sticks from smallest to largest. Moving from left to right, we look at a pair of sticks. We first compare sticks 1 and 2. If Stick 1 is larger than Stick 2, the sticks are swapped. Next we compare sticks 2 and 3. If Stick 2 is larger than Stick 3, the sticks are swapped. Moving down the line, we will make nine comparisons — the last one is a comparison of sticks 9 and 10.

At the end of the pass through the 10 sticks, what do we have? Since we swapped sticks each time the first stick in the pair was larger than the second, we find that the largest stick has "bubbled" down the line to the last position, Stick 10. The remaining sticks may be sorted, but probably aren't, although some sticks have been moved toward their correct position. We can now repeat the procedure for the remaining nine sticks. At the end of this pass, the next largest stick occupies Position 9. Eight more passes will guarantee that all sticks have been sorted. Of course, when no swaps are made during a pass, then the sticks have been sorted, even if 10 passes have not been made. The first pass is shown in Figure 4.

The *Bubble Sort* program is shown in Listing 2. Like the *Selection Sort* program, the screen is first filled with 126 sticks. The middle portion is the actual Bubble Sort. The last portion displays the swapped sticks and is similar to the line display subroutines in Listing 1.

If you run this program you'll see the swapping taking place as a dark line that moves across the screen. Each time the dark line appears, two adjacent sticks are being swapped. As the sort progresses, longer sticks build up on the screen right, one stick being added for each pass through the sticks. As the screen becomes sorted, you'll see fewer and fewer swaps being made.

The sort portion of the program uses two variables. Variable J always points to the last entry in the list. J starts at 126, the last screen line, but decreases by one for each pass. Variable I is the current location of the stick as a pass is made from Stick 1 to Stick J. Swaps are made by swapping stick

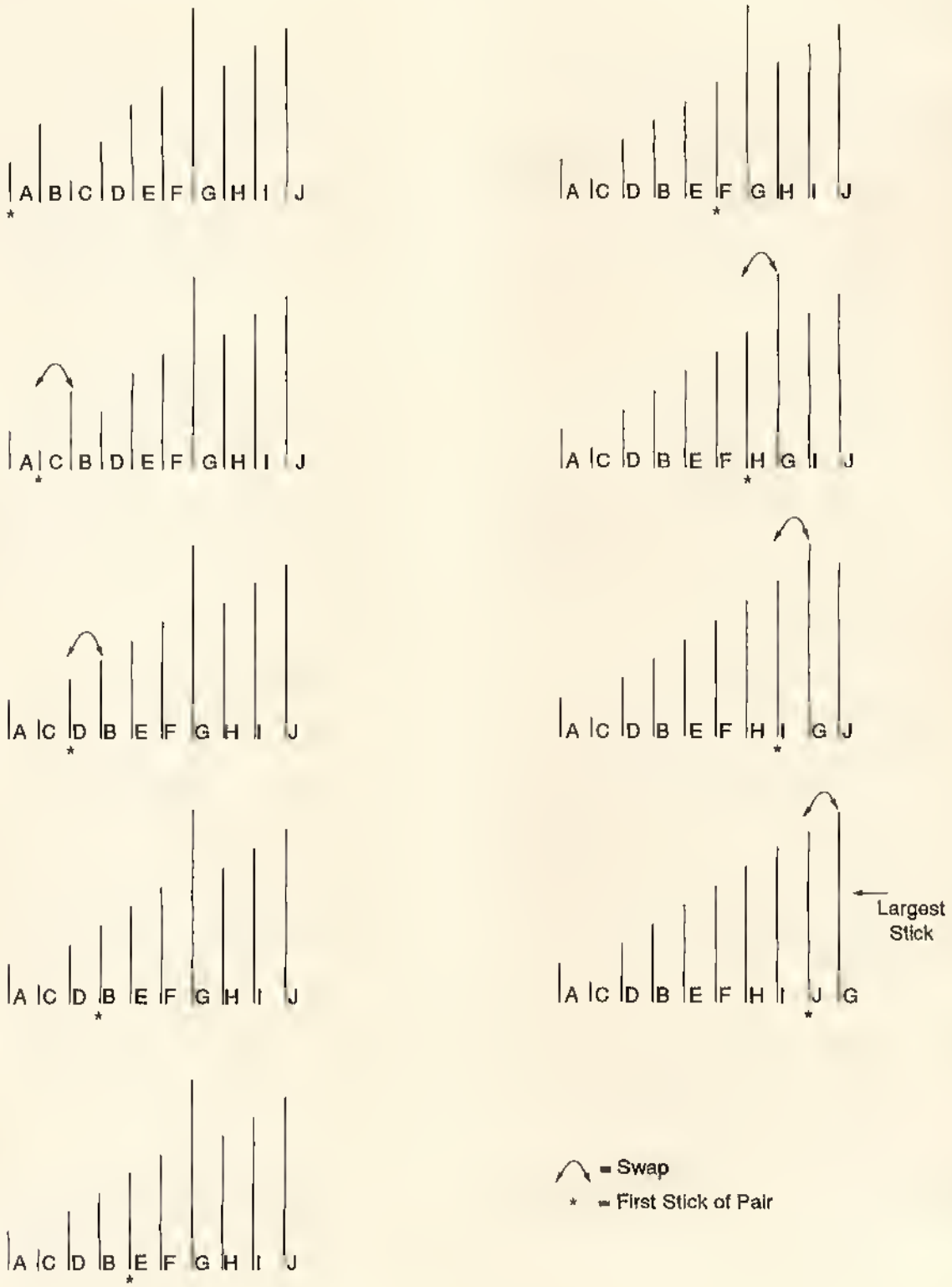

Figure 4: One Pass of a Bubble Sort

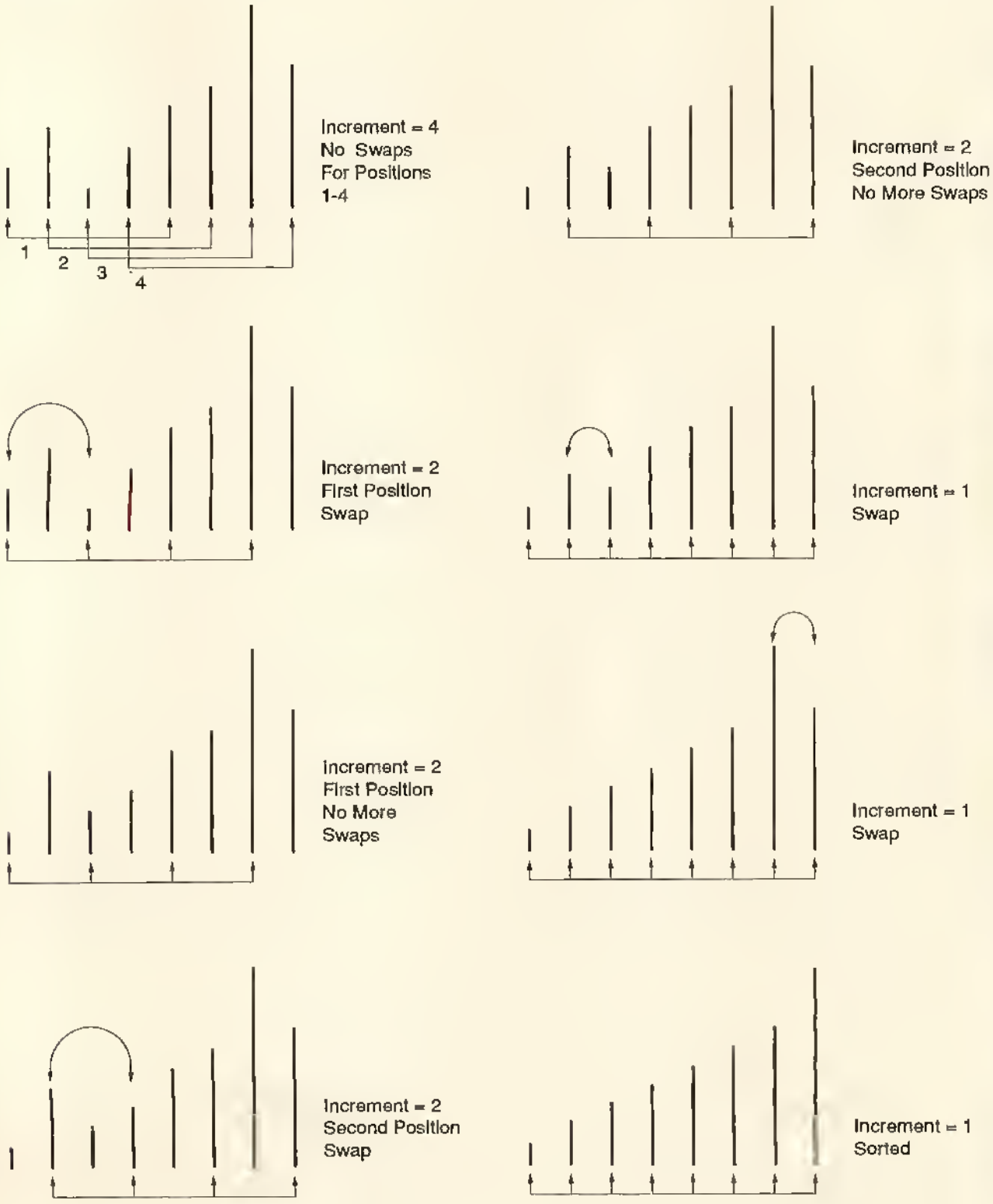

Figure 5: Shell Sort of Eight Sticks

ND(I) and ND(I + 1). A swap flag, held in SW, is set to 1 if a swap occurred. The sort ends when SW = 0 after a pass (no swap occurred) or J reaches 1.

Although the logic for the Bubble Sort is easy, it has one big disadvantage — it's slow for unsorted data. The sort in Listing 2 takes about 3 minutes to sort a screen of 126 sticks (values) when random stick lengths are used and screen graphics are not updated. When screen graphics are updated, the sort takes about 16 minutes. On the other hand, the sort is almost instantaneous when the data *is* sorted and very fast when only a few values are out of order. By comparison, the Selection Sort would slog through all 126 passes!

The Shell Game

Why is the Bubble Sort so slow? Although you can think about it abstractly, it's obvious from the screen — it takes many passes to move a stick that's out of order across a whole screen, and there are many sticks to be moved. It would be nice to bypass the tedious swapping and just throw the sticks in about the right location based upon length. You could then do a more detailed sort after the sticks were approximately arranged in order. This is the idea behind the *Shell Sort* program, shown in Listing 3.

The first part of the *Shell Sort* program generates the same type of random data as in the two preceding sorts — 126 sticks with values in array ND( ). The line display subroutines are at the end, as in the previous program. The actual shell sort is in the middle of the program.

The Shell Sort is more complicated than the Bubble Sort but is about five times faster — the program taking about three minutes instead of 16. This sort is *much* faster than the Selection Sort when the screen data is not updated (*Selection Sort* only re-draws 126 pairs of lines, but *Bubble Sort* and *Shell Sort* re-draw the lines constantly). A sort utility would not waste time displaying the sort data as we are doing.

The operation of the Shell Sort is obvious from the screen. The program uses an *increment* that spans the width of sticks. The increment begins at half of 126 — 63. Using this increment, sticks 1 and 64 are compared, and swapped if they are out of order. Next, sticks 2 and 65 are compared and swapped if out of order. This process continues until sticks 63 and 126 are compared. The pass is like the Bubble Sort — but with gaps. At the end of the first pass, many sticks have been moved approximately to the proper position. If any swaps occurred, the same increment — 63 — is used again. The increment of 63 is maintained until no swaps occur.

Next, the increment is divided approximately in half, to 31 (fractional values are not meaningful here, so a BASIC INT function is used to find the next lower integer value for the increment). Now the width of sticks are scanned again — a Bubble Sort of four items (i.e., Stick 1 is compared to Stick 32, Stick 32 to 63, Stick 63 to 94 and Stick 94 to 125). At the end of this pass, the smallest stick has been moved to Position 125. The increment of 31 is maintained until no swaps occur.

Now increments of 15, 7, 3 and 1 are used to further sort the data. The increment of 1 is really a Bubble Sort, but at this point most of the sticks have been positioned near their proper positions and the sort is much faster. The sort is over when the increment has been reduced to 0.

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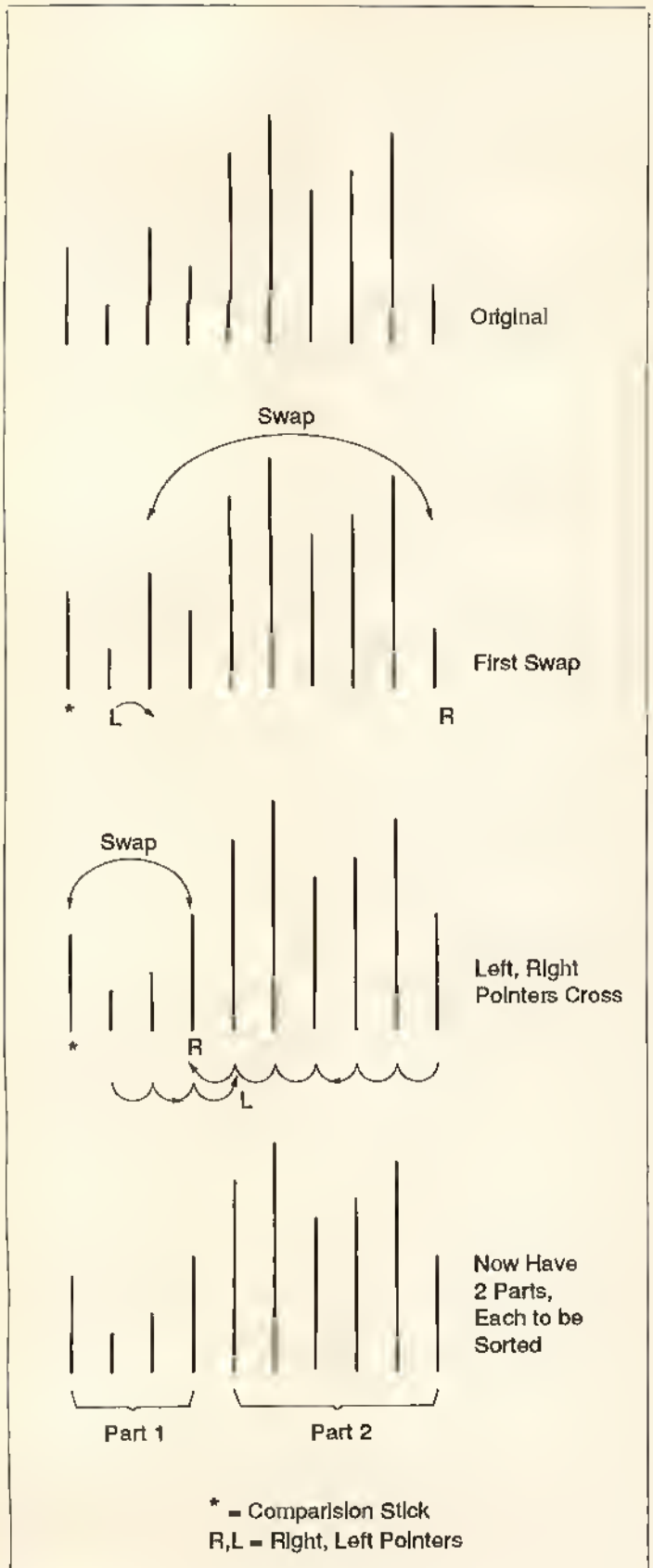


Figure 6: **Sample Quick Sort Pass**

The process is shown for an eight-stick row in Figure 5.

In the program, Variable IN is the increment, ST is the starting location, EN is the ending location and I is the current location within the range.

A Quicker Sort

The quickest sort of all for random data (when screen graphics are not considered) is the Quick Sort. It's more complicated than the Shell Sort, but it sorts screen data in about 45 seconds when graphics are not used and 90 seconds when graphics are used.

"I've seen the Acropolis by moonlight and Los Angeles through the haze, but I'll have to say that the* Quick Sort *display is really* beautiful *to watch — not so much in an aesthetic sense, but beautiful in a logical sense."

The Quick Sort works like this: Start with a row of 10 sticks again. Now choose the first stick in the row and note its length. The row is now divided into two parts — left and right. Sticks in the left part are of lesser or equal length to the comparison stick and sticks in the right part are of greater length. The sticks are ordered by moving down the row in both directions at the same time. The sort keeps moving from the right until the first stick shorter than the comparison stick is found, and keeps moving from the left until the first stick longer than the comparison stick is found. Those two sticks are swapped, and the sort continues until the comparison has reached the middle of the sort. The comparison stick is then swapped with the last entry of the left portion. A sample pass is shown in Figure 6.

Any stick in the left part is definitely smaller than any stick in the right part. However, within each part, the sticks probably aren't ordered. Now each part is considered separately. The whole process repeats again for the left part. The first stick is used as a comparison stick and the left part is further subdivided into two parts — the left part holding all sticks smaller than the comparison stick, and the right part holding all sticks larger than the comparison stick. The same process is repeated for the right part.

This division into parts continues until each part holds two units. In a 126-stick set, for example, there will be about 63 parts. The beauty of the sort is that sticks are moved over great distances and put into rough order without a lot of overhead.

The main problem with a Quick Sort is that a record must be kept of each part — the position number of the start and the position number of the end. This record keeping calls for a list or array of items. After each sort of a part, the list is used to find unsorted parts, which will then go through the process and generate new parts. A sample of a Quick Sort of a 10-item list — including a record keeping list — is shown in Figure 7.

The *Quick Sort* program is shown in Listing 4. The

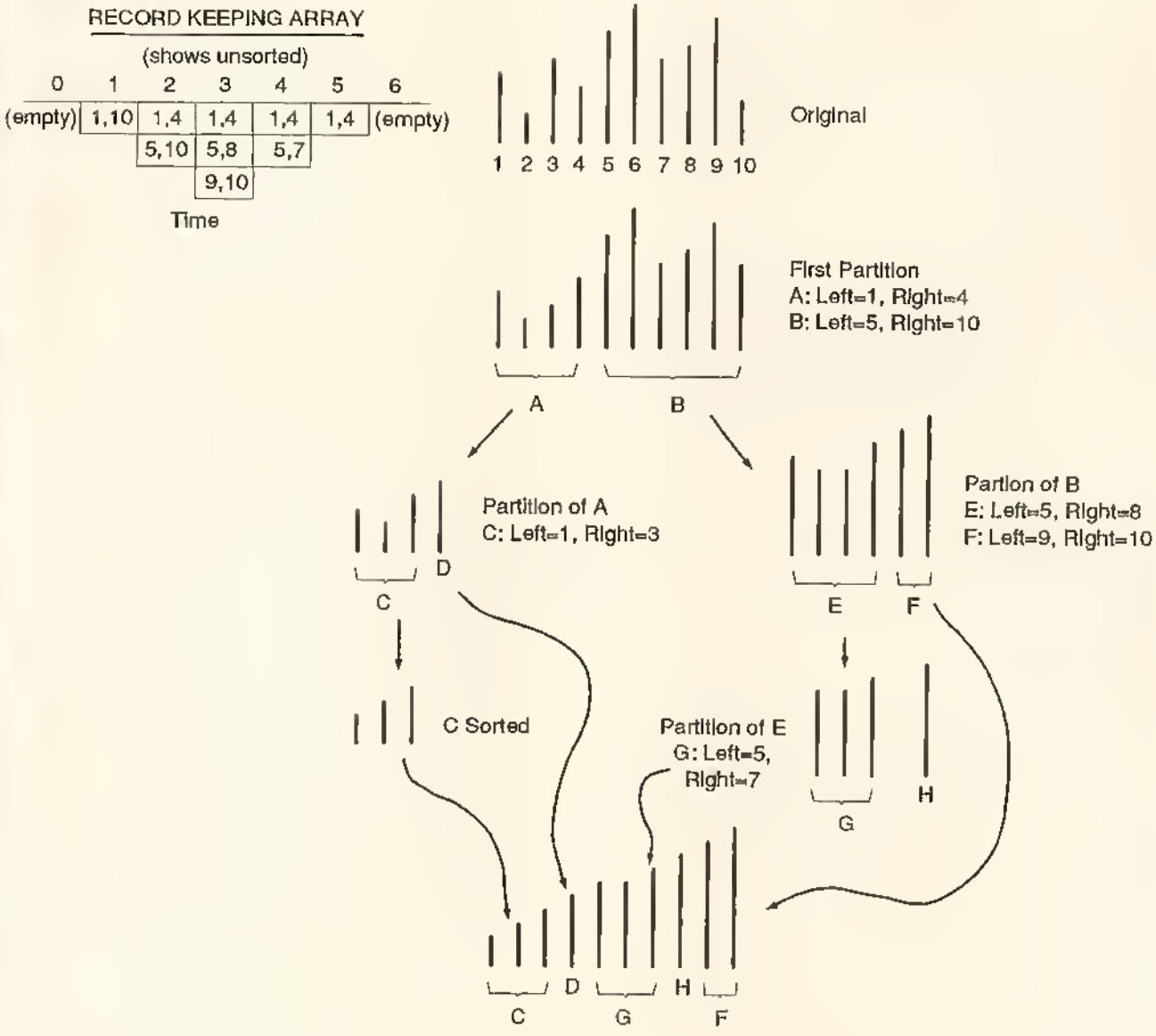


Figure 7: Quick Sort of a 10-Stick Row

generate data code is identical, and the line display subroutines are similar, to the other sorts. The actual sort code uses a housekeeping array, LS. The first value of the array — LS(0) — is a pointer to the next available location in the array (see Figure 8). Two values at a time are put into the array — the left- and right-most stick positions. There may be many different sets of these, defining both large and small parts. As parts are sorted, two new parts are created, and the end points of each of these are put into the LS array. End points are taken out two at a time to start a sort process. The sort loops back *looking for* new parts to sort. When LS(0)=0, all parts have been sorted.

Variables ST and EN are the starting and ending positions for a part. Variables LP and RP are the pointers to this part and move in from the left and right.

Another Computer Nerd

I've seen the Acropolis by moonlight and Los Angeles through the haze, but I'll have to say that the *Quick Sort* display is really *beautiful* to watch — not so much in an aesthetic sense, but beautiful in a logical sense. You can easily visualize the sorting process dividing the sticks into parts, sorting those parts, getting new parts from the record keeping list and sorting them, and finally working on very small increments. I hope there are enough CoCoists out there to share my enthusiasm. Let me know if you enjoy it.

See you next month with more CoCo topics. □

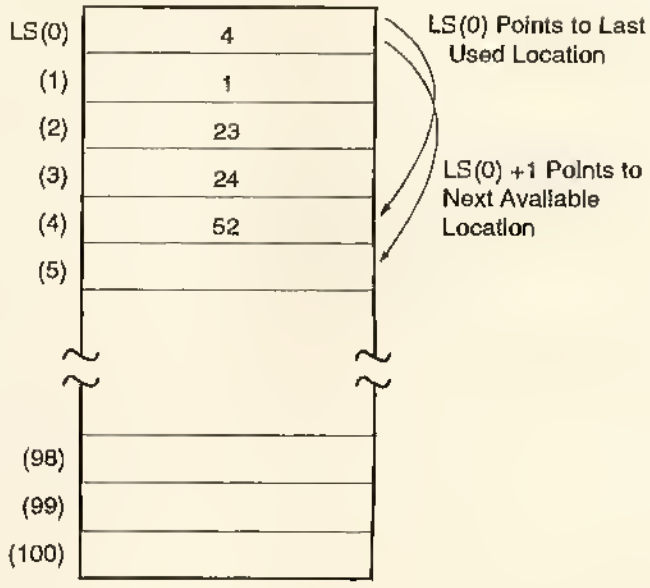


Figure 8: Quick Sort Housekeeping Array

Listing 1: SELECTON

```
10Ø ' GENERATE RANDOM DATA
11Ø PMODE 4
12Ø SCREEN 1,Ø
13Ø DIM NO( 126 )
14Ø PCLS Ø
15Ø FOR I = 1 TO 126
16Ø NO( I ) = INT( RND( 19Ø ) )
17Ø LINE ( I * 2, 19Ø ) - ( I *
2, 19Ø - NO( I )), PSET
18Ø NEXT
19Ø ' SELECTION SORT
2ØØ FOR J = 126 TO 1 STEP -1
21Ø LS = -1: SI = -1
22Ø FOR I = 1 TO J:IF NO( I ) >
LS THEN LS = NO( I ): SI = I: NE
XT I ELSE NEXT I
23Ø GOSUB 29Ø
24Ø TM = NO( J ): NO( J ) = NO(
SI ): NO( SI ) = TM
25Ø GOSUB 32Ø
26Ø NEXT J
27Ø GOTO 27Ø
28Ø 'LINE DISPLAY SUBROUTINES
29Ø LINE ( J * 2, 19Ø ) - ( J *
2, Ø ), PRESET
3ØØ LINE ( ( SI ) * 2, 19Ø ) - (
 ( SI ) * 2, Ø ), PRESET
31Ø RETURN
32Ø LINE ( J * 2, 19Ø ) - ( J *
2, 19Ø - NO( J ) ), PSET
33Ø LINE ( ( SI ) * 2, 19Ø ) - (
 ( SI ) * 2, 19Ø - NO( SI ) ), P
SET
34Ø RETURN
```

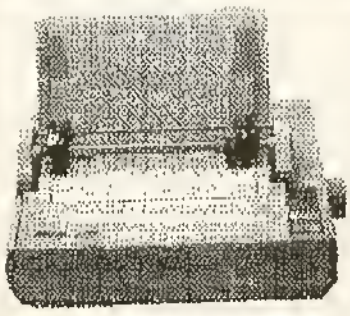
Listing 2: BUBBLE

```
10Ø ' GENERATE RANDOM DATA
11Ø PMODE 4
12Ø SCREEN 1,Ø
13Ø DIM NO( 126 )
14Ø PCLS Ø
15Ø FOR I = 1 TO 126
16Ø NO( I ) = INT( RND( 19Ø ) )
17Ø LINE ( I * 2, 19Ø ) - ( I *
2, 19Ø - NO( I )), PSET
18Ø NEXT
19Ø ' IMPROVED BUBBLE SORT
2ØØ SW = Ø
21Ø FOR J=125 TO 1 STEP -1
22Ø FOR I = 1 TO J: IF NO( I ) >
 NO( I + 1 ) THEN GOSUB 26Ø: TM
= NO(I):              NO(I)=NO(I+1
):NO(I+1)=TM:SW=1: GOSUB 29Ø: NE
XT ELSE NEXT
23Ø IF ( SW <> Ø ) AND ( J <> 1
) THEN SW = Ø: NEXT J
24Ø GOTO 24Ø
25Ø ' LINE DISPLAY SUBROUTINES
26Ø LINE ( I * 2, 19Ø ) - ( I *
```

```
2, Ø ), PRESET
27Ø LINE ( ( I + 1 ) * 2, 19Ø )
- ( ( I + 1 ) * 2, Ø ), PRESET
28Ø RETURN
29Ø LINE ( I * 2, 19Ø ) - ( I *
2, 19Ø - NO( I ) ), PSET
3ØØ LINE ( ( I + 1 ) * 2, 19Ø )
- ( ( I + 1 ) * 2, 19Ø - NO( I +
 1 ) ), PSET
31Ø RETURN
```

Listing 3: SHELL

```
1ØØ ' GENERATE RANDOM DATA
11Ø PMODE 4
12Ø SCREEN 1,Ø
13Ø DIM NO( 126 )
14Ø PCLS Ø
15Ø FOR I = 1 TO 126
16Ø NO( I ) = INT( RND( 19Ø ) )
17Ø LINE ( I * 2, 19Ø ) - ( I *
2, NO( I )), PSET
18Ø NEXT
19Ø ' SHELL SORT
2ØØ IN = 126
21Ø IN = INT( IN / 2 )
22Ø IF IN = Ø THEN GOTO 37Ø
23Ø ST = 1
24Ø IF ST > IN THEN GOTO 21Ø
25Ø SW = 1
26Ø IF SW = Ø THEN GOTO 35Ø
27Ø SW = Ø
28Ø I = ST
29Ø EN = ST + IN
3ØØ IF EN > 126 THEN GOTO 26Ø
31Ø IF NO( EN ) > NO( I ) THEN G
OSUB 39Ø:TM = NO( I ): NO( I ) =
 NO ( EN ): NO( EN ) = TM: SW =
1: GOSUB 42Ø
32Ø I = EN
33Ø EN = EN + IN
34Ø GOTO 3ØØ
35Ø ST = ST + 1
36Ø GOTO 24Ø
37Ø GOTO 37Ø
38Ø ' LINE DISPLAY SUBROUTINES
39Ø LINE( I * 2, 19Ø ) - ( I * 2
, Ø ), PRESET
4ØØ LINE( ( EN ) * 2, 19Ø ) - (
( EN ) * 2, Ø ), PRESET
41Ø RETURN
42Ø LINE ( I * 2, 19Ø ) - ( I *
2, NO( I ) ),PSET
43Ø LINE ( ( EN ) * 2, 19Ø ) - (
 ( EN ) * 2, NO( EN ) ), PSET
44Ø RETURN
```

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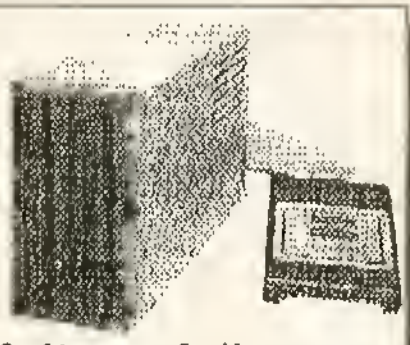

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Listing 4: QUIKSORT

```
1ØØ ' GENERATE RANDOM DATA
11Ø PMODE 4
12Ø SCREEN 1,Ø
13Ø DIM NO( 126 ), LS( 1ØØ )
14Ø PCLS Ø
15Ø FOR I = 1 TO 126
16Ø NO( I ) = INT( RND( 19Ø ) )
17Ø LINE ( I * 2, 19Ø ) - ( I *
2, 19Ø -NO( I )), PSET
18Ø NEXT
19Ø ' QUICKSORT
2ØØ LS( Ø ) = Ø
21Ø LS( LS( Ø ) + 1 ) = 1
22Ø LS( LS( Ø ) + 2 ) = 126
23Ø LS( Ø ) = LS( Ø ) + 2
24Ø IF LS( Ø ) = Ø THEN GOTO 45Ø
25Ø EN = LS( LS( Ø ) )
26Ø ST = LS( LS( Ø ) - 1 )
27Ø LS( Ø ) = LS( Ø ) -2
28Ø LP = ST + 1
29Ø RP = EN
3ØØ DN = Ø
31Ø IF DN = 1 THEN GOTO 24Ø
32Ø IF NO( ST ) >= NO( LP ) AND
LP < RP THEN LP = LP + 1: GOTO 3
2Ø
33Ø IF NO( ST ) <= NO( RP ) AND
LP < RP THEN RP = RP - 1: GOTO 3
3Ø
34Ø IF LP <> RP THEN GOTO 42Ø
35Ø DN = 1
36Ø IF EN - ST = 1 THEN IF NO( S
T ) > NO( EN ) THEN I = ST: J =
EN: GOSUB 47Ø:      TM = NO( ST
): NO( ST ) = NO( EN ): NO( EN )
= TM: GOSUB 5ØØ: GOTO 31Ø
37Ø IF EN = RP AND NO( ST ) > NO
( EN ) THEN I = ST: J = EN: GOSU
B 47Ø: TM =          NO( ST ):NO(
 ST ) = NO( EN ):NO( EN ) = TM:L
S( LS( Ø ) +1 )=ST:LS( LS( Ø ) +
    2 ) = EN: LS( Ø ) = LS( Ø )
+ 2: GOSUB 5ØØ: GOTO 31Ø
38Ø I = ST: J = LP - 1: GOSUB 47
Ø: TM = NO( ST ): NO( ST ) = NO(
 LP - 1 ) :          NO( LP - 1 )
 = TM: GOSUB 5ØØ
39Ø IF LP - ST > 2 THEN LS( LS(
Ø ) + 1  ) = ST: LS( LS( Ø ) + 2
 ) = LP - 1:         LS( Ø ) = LS
( Ø ) + 2
4ØØ IF EN - RP > Ø THEN LS( LS(
Ø ) + 1 ) = LP: LS( LS( Ø ) + 2
) = EN: LS( Ø )=    LS( Ø ) + 2
41Ø GOTO 31Ø
42Ø I = LP: J = RP: GOSUB 47Ø: T
M = NO( LP ): NO( LP ) = NO( RP
): NO( RP )=TM:     GOSUB 5ØØ
43Ø GOTO 31Ø
44Ø GOTO 24Ø
45Ø GOTO 45Ø
46Ø ' LINE DISPLAY SUBROUTINES
47Ø LINE( I * 2, 19Ø ) - ( I * 2
, Ø ), PRESET
48Ø LINE( ( J ) * 2, 19Ø ) - ( (
 J ) * 2, Ø ), PRESET
49Ø RETURN
5ØØ LINE ( I * 2, 19Ø ) - ( I *
2, 19Ø - NO( I ) ),PSET
51Ø LINE ( ( J ) * 2, 19Ø ) - (
( J ) * 2, 19Ø - NO( J ) ), PSET
52Ø RETURN
```


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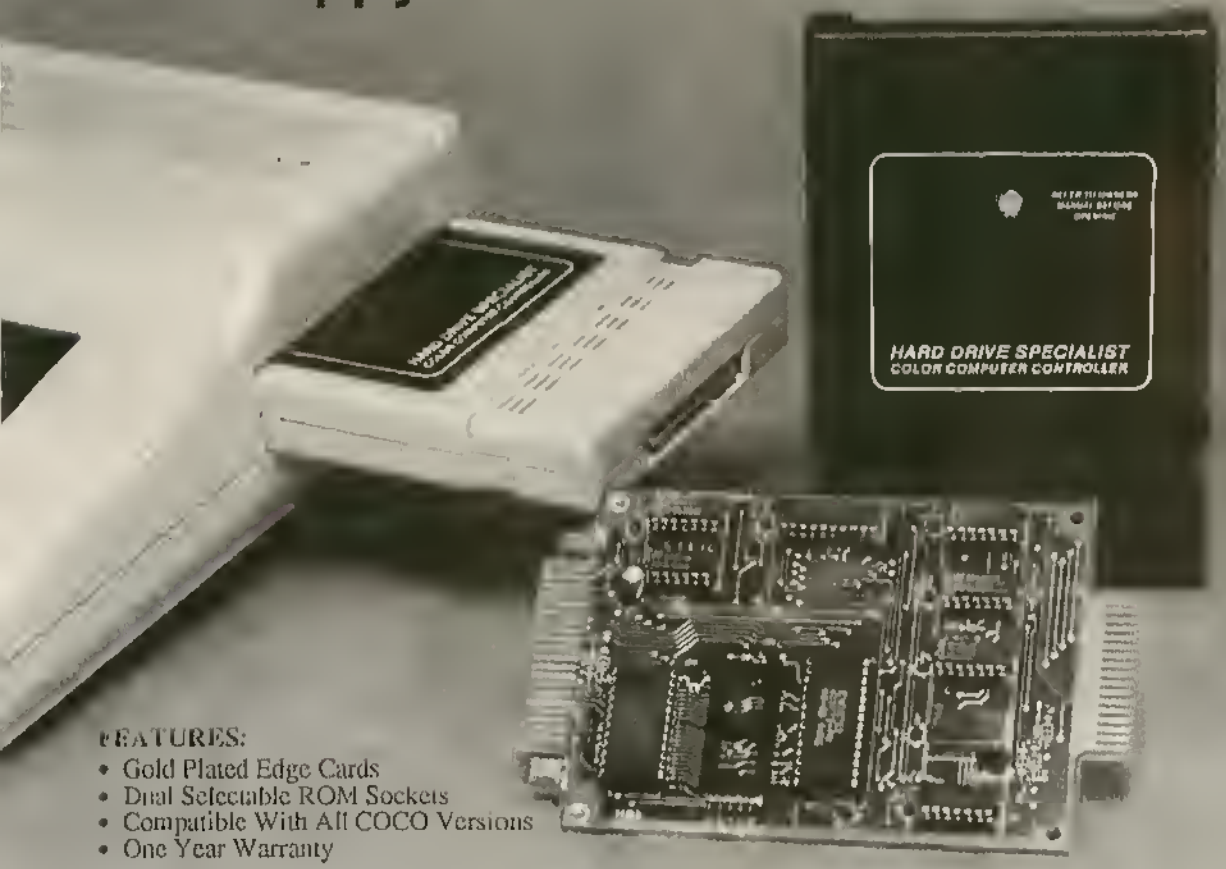

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Boot Mysteries Revealed

By Richard A. White
Rainbow Contributing Editor

I have talked about the OS-9 players — the program modules that manage the computer's operation and the specific data files (generally called descriptors) that provide the operating system with the information it needs to work. I have also mentioned that OS-9 can be configured to match your exact system hardware. System configuration is determined by the modules loaded at OS-9's start-up. These modules are included in the Kernel, located on Track

One of the Kernel's functions is to initialize the system and then load OS9Boot. Since the CoCo 3 is different from the CoCo 1 and 2, one would expect the Kernels for the machines to be different. This is partly true. The OS-9 Disk Operating System (Radio Shack, Cat. No. 26-3030) is Level I, Version 1 for CoCo 1 and 2s and will not work on CoCo 3s without modification. A Level I, Version 2 upgrade (special order, Cat. No. 700-2331, $24.95) works on the CoCo 3, but it cannot take advantage of more than 64K of memory or support CoCo 3 graphics. Level II, on the other hand, uses up to 512K of RAM in a CoCo 3 and uses all its graphics features. Level II will only work in a CoCo 3, and it is rather limited in a 128K machine. However, it really shines in a 512K machine.

As you might expect, the Level II Kernel is quite different from the Level I versions. There are changes to other operating system modules as well. The modules to handle the keyboard and screen are new. The disk drive manager, CC3Disk, is also new and now handles any double density drive (single- or double-sided, 35-, 40- or 80-track) you want to connect to your system. Consistent with OS-9's design philosophy, which keeps modules transportable between versions whenever possible, most of the other modules are the same as in Level I.

So the first configuration choice you must make is between Level I and Level II. (It's not much of a choice. Level I on a CoCo 3 is a waste of capability.) This is also the only choice that you can buy from Radio Shack. You must use OS-9's utilities to install all other options yourself. OS-9 Level I and Level II both come on single-sided, 35-track disks. Most users can put the System Disk into Drive 0, type DOS and let the computer boot into OS-9. A few users with older drive controllers will have trouble.

Disk Extended Basic Version 1.0 does not support the DOS command. A short program is provided in the documentation of Radio Shack's OS-9 package that creates a machine language loader. A more costly problem occurs with old, long black controllers sold from 1982 to 1984. Most of these cannot reliably handle the 1.8 MHz CoCo 3 clock speed. This problem is particularly nasty because the controller will *almost* work reliably. But almost isn't good enough, and the only safe solution is to replace the controller.

Next, let us consider what happens during the boot. Generally, this information is not discussed, or it is placed under "technical information" where few will bother to read it. It *is* technical information, but making a new boot is a technical operation — particularly under Level II. The more knowledge you have about the operation, the less confusion you will encounter. I have wandered through my share of OS-9 fog, and I speak with authority. Don't let this scare you. I survived and so will you. After all, if you learned to walk and talk, you can learn to make a boot file.

The DOS command under Disk BASIC causes the code on Track 34 to be loaded and executed. (Since track numbering begins with zero, Track 34 is the 35th track.) Under Level I, this code consists of two modules: DS9 and OS9p1. The Level II code includes three modules: REL, Boot and Os9p1. In both cases, these modules initialize the machine, complete the boot operation, link to all the other system modules as they are loaded, and provide basic system services (i.e., memory management and multitasking).

Merging Files

Completing the booting process includes loading the OS9Boot file. This file merges all the system modules to be used. Merging files is a particularly useful tool under OS-9 — especially

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the co-author of the TIMS *database management program.*

under Level II. Understanding the operation can be quite useful, so make the effort to learn the process.

A normal OS-9 file starts at the beginning of a sector (256 bytes) of a disk. The file's end will use part of another sector, the remainder of which is wasted. When a number of files are merged into a single new file, each merging file follows immediately after the preceding file. No space is lost. A directory will list the new file, but not the names of the files it contains. Because these merged files still maintain their individual identities, the Ident utility will show the header information for each file contained in the new one. With your system disk in /d0, type ident /d0/OS9boot, and you will see what I mean.

When you load a file into memory, OS-9 starts that file at the beginning of a 256-byte page under Level I or at the start of an 8K block under Level II. Therefore, if you load three 1K files individually under Level II, you will use 24K of memory. Memory is too dear for this kind of waste.

A merged file starts loading into memory like any other file — at the beginning of a page or block. However, the files it contains are loaded immediately following each other in memory. Page and block boundaries are disregarded. Considerable memory is saved — especially with device descriptors, which typically use only 50 to 80 bytes. Since many OS-9 utilities are small, merging five, 10 or even 15 files into a single file allows those files to be placed in one 8K block. Even those of us with 512K CoCo 3s enjoy this memory saver.

So OS9Boot is simply one file into which all the system modules you will use are merged. The code that loads OS9Boot is rather simple, too. Consequently, make sure that OS9Boot is not divided into a number of places on your disk (OS-9 will split up a file if need be to make best use of disk space). When you make a new boot disk, use a freshly formatted disk to avoid this problem.

Shell

Under Level I, everything OS-9 needs should be included in OS9Boot. Once OS9Boot has been loaded, run the StartUp file. StartUp is a text file that contains commands you could have typed in at the OS9 prompt. Files of this nature are sometimes called procedure files or shell scripts.

Shell is a program that allows the computer to interpret any command entered into it. The logical people who wrote OS-9's interpreter named it *Shell*. OS-9's *Shell* normally takes its input from the keyboard, but it can take it from a text file as well. Think of all the commands that you can type at the OS9 prompt as a language. A text file of those commands would be like a program. In fact, Level II has a rich selection of graphics commands that can be entered at the OS9 prompt using Display. You could write a large text file of Display commands and generate a full-color picture, complete with text, using no "language" other than OS-9. The StartUp file can get quite long, particularly under Level II.

Under Level I, *Shell* is normally included in OS9Boot. This option uses the least memory. A different strategy applies under Level II. *Shell* is more a utility than a system module, and it does not need to be in the OS9Boot. No matter how much memory is in the computer, a 6809 microprocessor can deal with only 64K at a time. The CoCo 3 and OS-9 manage memory by switching 8K blocks in and out of the microprocessor's 64K "work space." If *Shell* is loaded separately from OS9Boot, it does not have to be in the "work space" at the same time as the boot modules. In this manner, the boot can contain other modules that need to be there. Thus, under Level II, *Shell* is loaded separately with a command included in the StartUp file and does not need to be in the CMDS directory of your boot disk, if a full path to it is provided in the StartUp file.

While *Shell* is less than 2K bytes, the Shell file supplied on the Level II system disk is really a merged file that includes several other frequently-used utilities, which almost fill an 8K block.

Another point at which Level II differs from Level I is the video and keyboard area. To take full advantage of CoCo 3 graphics and text options, additional code was needed. This code was divided among several modules. One such module, GrfDrv, is loaded separately and is not included in OS9Boot. GrfDrv is loaded immediately after OS9Boot, before the StartUp file. Consequently, it *must* be in the CMDS directory of your boot disk.

At this point, we know some of the things that must be on a boot disk. The Kernel must be on the 35th track on the front of the disk. On a single-sided disk, this is Track 34. On a double-sided disk, OS-9 counts the first track on the front as Track 0, the first track on the back as Track 1, etc., toward the center of the disk. In this case, Track 34 is not on the 35th top-side track. However, Disk BASIC does not know about double-sided disks. When you boot from a double-sided disk, it looks at the 35th top-side track for the Kernel. Boot-making utilities provided with Level I assume you are using single-sided disks and do not properly deal with double-sided disks even if you have replaced your standard disk I/O driver with one that uses double-sided disks. On the other hand, Level II utilities handle double-sided disks properly. In this case, the utilities provided with Level II

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are different from those of the same name in Level I.

The DS9Boot file must be a continuous file in the root directory. A Startup file must also be in the root directory. There must be a CMDS directory on a Level II boot disk. GrfDrv and the Shell file must also be available for loading when the Startup file runs.

The simplest way to make a new boot disk is to back up the one you already have. Naturally, you will have followed the directions in the documentation and backed up the operating system disk that comes with your OS-9. Right? Whenever you make a new boot disk, back it up as well.

Next you can use the program, *Cobbler*. *Cobbler* uses the system modules as they exist in memory at the time to make a new boot disk. Start with a freshly formatted disk. *Cobbler* will then copy the Kernel modules to the 35th top-side track and put all other modules loaded from DS9Boot into a new DS9Boot. The primary purpose of this program is to save changes made to descriptors with Xmode.

Most users will need to change /t1, /t2 and /p from their defaults to match their current setups. /t1 and /t2 describe how the RS-232 ports work. One default setting is 300 baud. Most of us now use 1200 baud for telecommunications, and some use 2400 baud. If you want to run at a baud-rate higher than 300, include an Xmode command in your Startup file to change /t1 or /t2 each time you boot. Similarly, few of us still run our printers at the 600-baud default. This can be changed by using Xmode on the /p descriptor. However, these changes only last through the current session and are lost as soon as you turn off your computer. When you use *Cobbler* to make a new boot disk, the descriptors in DS9Boot will include the modifications made using Xmode, so you can eliminate the Xmode steps from your Startup file.

Using Dsave

The boot disk you make with *Cobbler* contains only the Kernel and DS9Boot. You must also add the remaining directories and files on your starting boot disk. To do this, use Dsave, which will copy or back up all files in one or more directories — including a whole disk. Dsave will not copy DS9Boot unless that option is specifically selected.

In addition, Dsave does not directly copy files; it makes a procedure file that you later run to do the job. There are a number of advantages to this procedure. You can edit the procedure file and eliminate copy commands for files you don't want to copy or add copy commands for files you want to copy from a disk in a different drive. Additionally, the copy or backup does not depend on the source and target disks being the same. Use this procedure file to make the 35-track system disk from your OS-9 package a double-sided 40-track boot disk, or to move the contents of a boot disk — excluding the Kernel, Ds9Boot and Grfdrv — to a hard drive. To boot, most hard drive users load the Kernel, DS9Boot and GrfDrv from a floppy in /d1. After the initial loading, OS-9 discovers an /h0 device descriptor and automatically continues the boot procedure from the hard drive.

When using Dsave, change your data directory to the one you want to copy. (The term *one or more directories* can mean a whole disk, since Directory /d0 is the root directory of the disk in Drive 0, and all files and subdirectories on that disk are under the root directory.)

Next, determine which Dsave options you want to use. The only one we need to consider now is the 's' option. The format for this option is -s *integer*, where *integer* is the amount of memory, in kilobytes, you want to allocate to the copy process. The entry, -s20, will allocate 20K bytes, which will handle nearly all files on a boot disk. Now you may want to decide to which drive (and, possibly, to which directory on that drive) you want to copy. Finally, you need to name the procedure file Dsave will make and choose the drive and directory on which it will be stored.

Now, let's see how Dsave works. First, use *Cobbler* to put the Kernel and DS9Boot on a freshly formatted disk. Put the Level II system distribution disk in Drive 2. (Generally, you will find it more convenient to have your source disk in Drive 0.) Putting the disk in Drive 2 will better demonstrate the flexibility of Dsave. Next, type the following:

```
DS9:chx /d2/cmds
DS9:chd /d2
DS9:dsave -s20 /d2 /d0 >/d2/
    makecopy
```

Because the process requires the use of several program modules, the first line is used to change the current CMDS directory to /d2. The next line puts you in the root directory of /d2, from which you want to copy. The final line enters the Dsave command. Option -s20 tells Dsave to have Copy allocate 20K bytes of buffer for each copy operation. The descriptor, /d2, reminds Dsave that you want override the built-in /d0 default and copy from Drive 2. The descriptor, /d0, tells Dsave to copy to drive 0 and to include a chd /d0 line in the procedure file. Finally, >/d2/make-copy directs the resulting procedure into a file named makecopy on /d2. The following is a shortened version of the resulting procedure file:

```
  t
  chd /d0
  tmode .1 -pause
  load copy
  Makdir CMDS
  Chd CMDS
  Copy #20K /d2/CMDS/attr attr
  Copy #20K /d2/CMDS/backup
       backup
.
.
.
  Copy #20K /d2/CMDS/unlink
unlink
  Copy #20K /d2/CMDS/xmode
xmode
  Chd ..
  Makdir SYS
  Chd SYS
  Copy #20K /d2/SYS/errmsg
       errmsg
.
.
.
  Copy #20K /d2/SYS/stdptrs
stdptrs
  Chd ..
  Copy #20K /d2/startup start-
       up
.
.
.
  Copy #20K /d2/makecopy make-
copy
  unlink copy
  tmode .1 pause
```

In this file, t is a shell command that tells *Shell* to display each line in the procedure file on the screen so we can keep up to date on what is happening. Tmode .1 -pause tells *Shell* not to stop the display and the procedure after a certain number of lines are printed to the screen. The *Shell* default stops printing so you have time to see what was displayed and press ENTER to continue. The .1 refers to the standard output to your screen. (Note at the bottom of the listing, Tmode .1 pause returns the pause feature.)

Next is a Load Copy command. Since Copy is used so often, it saves time to

load it once and unlink it at the end of the procedure. If Copy is already loaded, the Load command increases its link count by one, and Unlink decreases the link count by one. Copy stays in memory. Next, Makdir CMDS creates a CMDS directory. Dsave's default assumes that none of the needed directories on the target disk exist and that it will have to include commands to make these directories. This is exactly what we need here. The procedure file has used four OS-9 utilities: Tmode, Load and Makdir, which must either be in memory or in your current CMDS directory, and Copy. (Since the line Load Copy is used, OS-9 will try to load it from your CMDS directory whether it is in memory or not, so you must have Copy in your CMDS.) At the end of the procedure file, Unlink is used so it must be in memory or in the CMDS directory as well.

Having made a CMDS directory, chd CMDS makes that the current data directory and copying begins. Each Copy command includes #20K, which tells the program to use a 20K-byte buffer. We used the option -s20 to instruct Dsave to include this. Since /d0/CMDS is the current data directory, Dsave includes a full path (i.e., /d2/CMDS/attr) to the file to be copied; but since the file is being copied into the current data directory, Dsave needs only to provide the target file's name.

Most of the rest of the procedure file, except for Chd .., is repetitious. The ".." is shorthand for "previous directory above the current one." When I started Dsave, my current data directory was /d2. Since the disk in /d2 is the one I want to copy and I saved the procedure file, makecopy, onto that disk, I need only to put my target disk into /d0, type makecopy to start the procedure file, and get a drink or do something else while the process takes a few (long) minutes to run.

If you think this is easy, there is a better shortcut for those who don't want to edit the procedure file. Don't make a procedure file at all, just redirect the output for Dsave directly into *Shell* for immediate execution. Using our previous example, put the source disk in /d2 and the target disk in /d0, and type the following:

```
OS9:chx /d2/cmds
OS9:chd /d2
OS9:dsave -s20 /d2 /d0 ! shell
```

Everything is the same in this second example except that >/d2/makecopy is replaced by ! shell. The '!' is the set of pipe commands that routes the standard output of the foregoing process into the standard input of the following process. Look at page 6-41 in your Level II manual and circle the short paragraph that covers this, since you will certainly want to find it quickly in the future. When you type Dir, you get a listing on the screen of the names of the modules and directories in your current data directory. *However, if* you type Dir e, you will get that listing in much greater detail, including the date and time the file was saved, attributes of the file, the starting sector on the disk and the byte-count of the file. Well, the byte-count of *this* file has gotten large enough that I had better quit for this month.

My next column will cover the OS9Gen and Config processes for making a boot disk. We will also discuss the infamous, unsolvable, Level II boot order problem that has totally confounded all the experts since Level II for the CoCo 3 first came out. I will leave you pondering this enigma until next month.

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PCRENAME	rename PC file	FLEXDIR	directory of FLEX disk
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Installation, Automation and More

By Dale L. Puckett
Rainbow Contributing Editor

November is a good time to start some serious programming. I hope that this month's interview will help you get more enjoyment out of those long sessions with your CoCo.

CCEnv

Allow me to introduce a man who got tired of the complicated and redundant process required to compile C programs — and did something about it. Chris Fox has been programming since 1978 when someone gave him a Casio calculator that spoke BASIC. He started working with C four years later.

Fox bought a CoCo 2 with 16K of memory because he wanted to work with graphics and color. (It was also one of the only computers on the market he could afford.) He learned a lot with his CoCo 2, but he wanted to learn more. When OS-9 came out in 1983, he had to have it. When the Microware C compiler came out, he had to have that, too. The compiler was Fox's first experience with C language, and it took him a long time to learn the language and use the compiler. He explained: "I didn't have a second disk drive and didn't know I needed it. I really got things moving when I caught on and started using a RAM disk to compile my C programs. The RAM disk worked so well for me that I made it an automatic feature in *CCEnv*."

Fox wrote *CCEnv* because he was tired of the long directory names and command line options used to run the OS-9 text editor. *CCEnv* eliminated these length requirements.

Yet, *CCEnv* works with almost all OS-9 languages. You can run your Pascal compiler with it — or use it to assemble programs written for ASM or RMA. The *CCEnv* manual pages will even clip into your *Multi-Vue* manual.

An intelligent project manager is built into the program. "It's a graphics Make," Fox said. "It checks the date. If a text file has been updated, it's recompiled. If you have enabled the project option, *CCEnv* links to any relocatable object code you have written during the programming project. It automatically uses the startup code in CStart.r and the standard library, so you can split your programming projects into segments."

Fox's company, Foxware, sells a graphics library that works with C.Link in the original C compiler package and a C math library. Fox also offers a BASIC09 math library, and a BASIC09 mouse and menu library that help you create mouse-driven applications with pull-down menus. The latter contains many routines similar to the *Gfx3* package published in last month's column.

The Foxware graphics library includes a function that returns a pointer to the device name string. This makes it easier to use redirection from within your own program. While you can issue a fork call without the *devname* function, you can't redirect any output. To do that, you must know the name of the device receiving the output, not just the path number. *Devname* enables dynamic redirection — you can find an available window and redirect output to it immediately. The graphics library also includes a function that calls the device /w and returns the path number for you.

Essentially, *CCEnv* is a graphics driver for OS-9 compilers and assemblers, which lets you issue commands with a mouse-and-menu and eliminates long command lines. It also remembers compiler options and keeps track of your directories.

Chris Fox guarantees that there will be at least one less manual open on your lap when you use *CCEnv* to program. Fox used the Microware C compiler for more than a year before he tried *Turbo C* (one of the most convenient MS-DOS C compilers). He was struck by the ease of program development and determined to develop something similar for the CoCo 3.

Although Fox bought an IBM-compatible computer and intended to move on to the more *sophisticated* PC, it never happened. Fox explained, "After investing a few months to learn DOS, I realized that OS-9 is a superb operating system. I preferred the CoCo 3." Fox now uses his Tandy 1000 TX almost solely as a terminal for his CoCo 3 when he runs OS-9 Level 2.

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP; on packet-radio, KØHYD @ N4QQ; on GEnie, D.PUCKETT2; and on CIS, 71446,736.

After working on *CCEnv* for a few months, Fox began to use the half-finished program to complete itself. "The results were so pleasing that I decided to generalize *CCEnv* so it could run all OS-9 compilers and assemblers," he said. Fox also realized that this program, which had been developed for his own convenience, would be useful for other programmers as well.

Equipment

To run *CCEnv*, you'll need OS-9 Level II and the `WindInt` system module that comes with *Multi-Vue*. The program runs under *Multi-Vue* but can be run independently if `WindInt` is in your `OS9Boot` file. You will also need a mouse and 512K of memory. Compiling a program on the CoCo 3 without a RAM disk is a slow process. Therefore, *CCEnv* automatically writes all temporary files to the drive, `/r0`, if it is available. If that driver is not available, the program will prompt you for a drive name or directory. *CCEnv* will remember this location in its environment file, so you won't need to type it again until you want to change directories.

You must also supply your own OS-9 compiler, assembler and text editor. *CCEnv* is pre-configured for the Microware C compiler but works well with Pascal, `ASM`, `RMA` and `C_ASM`. The *CCEnv* edit menu offers four text editors: *Edit*, *Scred*, *TSEdit* from Tandy and *Xed* from MicroTech Consultants. If you don't own one of these, a fifth menu entry lets you specify your own editor.

To run *CCEnv*, copy two files to your OS-9 system disk. *CCEnv* goes in your `CMDS` directory. `Env_ccenv` goes in `/DD/SYS`. Make sure that any programs *CCEnv* will use are also in your `CMDS` directory. For example, the editor you plan to call from the menu and all the files in the Microware C compiler (except `ccl`) must be in `CMDS`. Additionally, you'll need the utilities you use during a programming session: `Attr`, `Dump`, `Debug`, `Verify` and `Tmode`.

If you would rather not clutter your `CMDS` directory, create a special directory for *CCEnv*, load it with your compiler files, editor and utilities, and change your current execution directory to the special *CCEnv* directory. You can do this before you run the program or from within the program itself; however, include the `StdPtrs` and `StdFonts` files in your `/dd/SYS` directory.

If you look in your modules directory after loading *CCEnv*, you'll see two new modules — `CCEnv` and `ShellCmd`. Run `CCEnv` by typing:

```
CCEnv pathlist options. . .
```

When *CCEnv* sees a hyphen, it knows that it has found an option. Otherwise, it treats a name on your command line as a pathlist to the file you want to compile or assemble. *CCEnv* uses the data directory holding the file you are compiling as its current data directory. Here's a typical *CCEnv* command line.

```
CCEnv filename -v
```

Type this line when you want to run a single session to compile an existing C or assembly program. To configure *CCEnv* to run OS-9 Development Kit assembler, type:

```
CCEnv -a -l -x=startup.a
- z=stdlib.asm -v=env.assm
```

When you type this line, *CCEnv* uses `RMA` to assemble your file and `RLINK` to link your object code. The program substitutes the assembly startup code for `CStart.r` and the standard library for `CLib_l`, and it saves the options you typed in an environment file, — `Env.Assm`. The next time you want to work with your assembler, just type:

```
CCEnv -v=env.assm
```

You can save as many environment files as you like. In fact, you can keep one for each program you develop. (*CCEnv* will automatically keep track of the libraries and other relocatable modules needed for each project.) Store these environment files in your `/dd/SYS` directory.

Menus

You'll find six menus on *CCEnv's* main menu bar — Close (a square box), File, Edit, Run, Compile and Option. If you are working with a binary file — a file with an `_r` or no extension — you'll notice that a Module menu replaces the Edit menu. From this menu, you can `Debug` or `Attr` your object code file.

Pop-up menus ask you for information when it's needed. For example, if you name a file with an unrecognized extension, you'll be asked to identify its type. Generally, a pop-up menu will ask Yes or No questions. If *CCEnv* needs a longer answer, it will request the answer in a dialog-box. Essentially, this is the only time you'll use your keyboard while running *CCEnv*. The rest of the time you can just click the mouse. For example, if your compiler runs into an error, you'll find out about it in a message box. After you read the note, click the mouse and the message box disappears. Inappropriate menus are disabled. Thus, if you have not picked a file to edit, the Edit, Run and Compile menus will be disabled.

The File menu allows the following options: Load a file. (You may choose

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any available in the present environment.) Abandon the file you are using. Count the characters, words and lines in a file, or check its syntax. Start an OS-9 Shell on another screen, or exit *CCEnv*. The Edit menu lets you select the editor to be used for a session. If you receive an error message during an assembler or compiler run, a two-window screen will appear on your CoCo. The possible error messages will appear in the six-row window at the bottom of the screen. You can then use them to correct the file in the top window. (This is certainly better than relying on my short memory.)

The Run menu runs the program you just compiled. If the file hasn't been compiled or assembled, *CCEnv* will do this for you and then run the program. This menu *will* compile, assemble, link and run a program with *one* mouse click.

The Compiler menu gives you four choices:

- To Assembly generates an assembly language file after compiling your C source code.
- To Object converts your assembler, or C source code, to a relocatable object code file with an .r extension.
- To Executable takes your C (assembly, or relocatable object) code file and produces an executable module, linking the new object code to other relocatable code listed in your link list. The file created is automatically stored in your execution directory.
- To Cancel lets you change your mind.

The Assembler, Compiler or Linker options from the options menu will show you *CCEnv*'s pull-down menus. Center the mouse over your selection and click the button. Without moving the mouse, you will now see a second menu. For example, if you click over the word Compiler, you'll be offered three choices in a pull-down menu: optimize defaults, check the 6809 stack, or run the C Profiler. You are presented similar choices when you click on Assembler, Linker, Link-List or Libraries.

CCEnv was created to make programming less tedious and more productive. It fills that bill nicely.

About Assemblers

I received an interesting note from Duane M. Perkins of Mount Gretna, Pa. He suggested that I point out the advantages of RMA — the Relocating Macro Assembler found in OS-9 Level II's Software Development package — over ASM — OS-9 Level I's original assembler.

RMA's main advantage is that it creates object files that can be linked with others later. According to Perkins: "The ability to include assembled functions and subroutines in a module speeds up program development."

Perkins submitted two short — but interesting and useful — listings to make his point: ClkSpd and ClkChk. ClkSpd, used with one of your programs, determines the clock speed of your CoCo 3. This information is essential if your program uses timing loops and must ensure a correct delay interval. ClkSpd calls ClkChk, which determines whether the clock speed is fast or slow and then tells you through a printed message.

You cannot directly execute a file created by the RMA assembler. It must be linked before it is run. However, you can assemble any number of source code files independently and use your linker to create an executable module that includes all of them. The linker also lets you use libraries, which can contain any number of independently assembled files. When you have finished this work with RMA, you will never have to do it again.

Some of the directives used in an RMA program are different than those used in an ASM program. For example, an RMA program uses Psect instead of Mod and Endsect instead of Emod. Another directive, Csect, marks the beginning of a data section and resets the base location counter for data offsets like ASM's directive, Org. In an RMA program, all data sections must end with an Endsect directive, and all rmb statements must be located in a Csect. Also, while your program may have any number of Csects, it can have only one Psect. Incidentally, RMA labels are case-sensitive. You'll need to be careful when typing the names of your subroutines and variables. Tandy supplies a file named OS9Defs.a that contains the standard OS-9 variables in the required Csect or Endsect format. Make sure that the labels used in your source code agree with the listing in this file — letter for letter.

The first module you link must con-

Listing 1: ClkSpd

```
   ifpl
   use /dd/defs/os9defs.a
   endc

        psect clkspd,$11,$81,Ø,2ØØ,Enter
Fast    fcc /Clock is fast/
        fcb $ØD
Slow    fcc /Clock is slow/
        fcb $ØD
Enter   lbsr Clkchk
        tsta
        bne Skip1
        leax Slow,pcr
        bra Skip2
Skip1   leax Fast,pcr
Skip2   ldy #32
        lda #1
        os9 I$WritLn
        os9 F$Exit
        endsect
```

Listing 2: ClkChk

```
   ifpl
   use /dd/defs/os9defs.a
   endc

        psect Clkchk,Ø,Ø,Ø,Ø,Clkchk
Clkchk:
        orcc #$5Ø
        lda $FFØ2
        sync
        lda $FFØ2
        ldd #2542
Clkchk1 subd #1
          bne Clkchk1
          clra
          ldb $FFØ3
          andcc #$AF
          bmi Clkchk2
          inca
Clkchk2 ldb $FFØ2
          rts
          endsect
```

Listing 3: DoMenu

```
PROCEDURE DoMenu
 ØØØØ       (* Adding functionality to MVShell
 ØØ22       (*
 ØØ25       (* Window menu data structures
 ØØ43       TYPE Mistr=_mnttl:STRING[15]; _mienbl:BYTE; _mires(5):BYTE
 ØØ64       DIM MidScr:Mistr
 ØØ6D
 ØØ6E       (* The next structure holds the definition of a menu.
 ØØA3       TYPE mnstr=_mittl:STRING[15]; _mnid,_mnxsiz,_mnnits,_mnenabl

             :BYTE; _reser2,_mnitems:INTECER
 ØØCF       DIM MNDscr:mnstr
 ØØD8
 ØØD9       (* The final structure defines the contents of an entire window.
```

```
0119      TYPE wnstr=_wnttl:STRING[20]; _nmens,_wxmin,_wymin:BYTE; _wnsync

           :INTEGER; _wnres(7):BYTE; _wnmen:INTEGER
014E      DIM WndScr:wnstr
0157
0158      (* Now we set up our intercept code
017B      TYPE IntCeptCod=StBCode:BYTE; IntAddr:INTEGER; RTICode,IntResult

           :BYTE
0196      DIM IceptCode:IntCeptCod
019F
01A0      IceptCode.StBCode:=$F7
01AC      IceptCode.IntAddr:=ADDR(IceptCode)+4
01BD      IceptCode.RTICode:=$3B
01C9
01CA      (* We must also define a data type to hold the 6809 registers
0207      TYPE Registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
022C      DIM Regs:Registers
0235
0236      (* We must also tell our program what the mouse looks like.
0271      TYPE rodent=valid,actv,totm:BYTE; rsrv0:INTEGER; ttto:BYTE; tsst

           :INTEGER; cbsa,cbsb,ccta,cctb,ttsa,ttsb,tlsa,tlsb:BYTE

           ; rsrv1,bdx,bdy:INTEGER; stat,res:BYTE; acx,acy,wrx,wry

           :INTEGER
02E2      DIM msret:rodent
02EB
02EC      (* To enhance readability
0305
0306      DIM Menu_ID,Menu_Item:INTEGER
0311      DIM DoMenuItem,IgnoreMenu,DoContent:BOOLEAN
0320      DIM F_Icpt,F_Sleep:BYTE
032B      DIM I_Getstt,SS_MnSel,I_Dup:BYTE
033A      DIM I_SetStt,SS_MsSig,StdIn,StdOut,SS_GIP,SS_Mouse:BYTE
0355      DIM thePath,MouseSig,Follow,HorPos:INTEGER
0368      DIM Grp_Ptr,Ptr_Arr:BYTE
0373      DIM oldpath(3),newpath:BYTE
0383      DIM action:STRING
038A
038B      DoMenuItem:=FALSE \DoContent:=FALSE \IgnoreMenu:=FALSE
039D      Grp_Ptr:=2002 \Ptr_Arr:=1 \F_Icpt:=$09
03B3      F_Sleep:=$0A \I_Getstt:=$8D \I_SetStt:=$8E
03GB      SS_MsSig:=$8A \SS_MnSel:=$87 \SS_GIP:=$94
03E3      SS_Mouse:=$89 \Follow:=1 \StdIn:=0
03F9      StdOut:=1 \MouseSig:=10
0407      I_Dup:=$82
040F
0410      DIM EndStr:STRING[1]
041C      DIM Null,CallCode,FunCode:BYTE
042B      Null:=0
0432      EndStr:=CHR$(Null)
043B
043G      (* Window type defs.
0450      DIM WT_NBox,WT_FWin,WT_FSWin,WT_SBox,WT_DBox,WT_PBpox:INTEGER
046B      WT_NBox:=0 \WT_FWin:=1 \WT_FSWin:=2
0480      WT_SBox:=3 \WT_DBox:=4 \WT_PBox:=5
0496
0497      DIM MNEnbl,MNDsbl:BYTE
04A2      MNEnbl:=1 \MNDsbl:=Null
04BI
04B2      DIM WINSync:INTEGER
04B9      WINSync:=$C0C0
04G1
04C2      DIM MN_Move,MN_Clos,MN_Grow,MN_Uscrl,MN_Dscrl,MN_Rscrl,MN_Lscrl

           :BYTE
04E1      DIM MN_Tndy,MN_File,MN_Edit,MN_StyI,MN_Font,MN_Char:BYTE
04FC      MN_Move:=1 \MN_Clos:=2 \MN_Grow:=3 \MN_Uscrl:=4
0518      MN_Dscrl:=5 \MN_Rscrl:=6 \MN_Lscrl:=7
052D      MN_Tndy:=20 \MN_File:=21 \MN_Edit:=22
0542      MN_Styl:=23 \MN_Font:=24 \MN_Char:=8
0557
0558      (* Here are some more definitions you'll need in almost all of your
059B      (* Basic09 / Multi-Vue application programs.  This group takes care
05DE      (* of the many buffers used within OS-9 Level II.
060F
0610      DIM Grp_Font,Grp_Clip,Grp_Pat2,Grp_Pat4,Grp_Pat6:BYTE
0627      DIM Fnt_S8x8,Fnt_S6x8,Fnt_G8x8:BYTE
0636      DIM Ptr_Pen,Ptr_Ich,Per_Slp,Ptr_III,Ptr_Txt,Ptr_Sch:BYTE
0651      DIM WR_Cntnt,WR_Cntrl,WR_OfWin:BYTE
```

tain your main program *with* the module entry point. It must be assembled with a *non-zero type*/language code. Modules that you plan to link with this first module must have the type/language byte set to zero. Any location in your modules that you want to reference from another module must have a label ending with a colon. Thus, any variable name that ends with a colon will be recognized globally when you run your linker.

Procedure Files

I was happy to hear about Gil Shattuck's File Transfer Utilities at RAINBOWfest Chicago. I was even happier when I received a copy of Gil's latest version, based on *Multi-Vue*. However, I was delighted when I put the disk in Drive `/d0` and clicked on the *Multi-Vue* icon.

There were two procedure files on the disk from Granite Computer Systems, so I pointed to the first with the mouse and clicked to select it. I moved the pointer to the File menu and listed the file. It was an installation file. One of the procedure files Shattuck provides loads `FTU` from the GCS master disk to your system disk in Drive `/d0`. The other procedure copies the files to the disk in Drive `/h0`. I use `/h0` and *GShell+* from the OS-9 Users Group, so I clicked on the second procedure file's icon and returned to the keyboard to write a few more sentences. While I worked, *GShell+* ran the procedure file. In a few minutes, Shattuck's `FTU` was installed.

The procedure file supplied by GCS moved the file, `AIF.ftu`, to my `CMDS` directory. When it had finished, I copied that file to the directory where I group my `AIF` files. I then clicked on the update bar (located just below the *Multi-Vue* menu bar) and, like magic, the `FTU` icon appeared on my screen. (I capitalize the letters "AIF" in my file names and use the *GShell+* sort routine so that the icons used with my most frequently run programs are placed at the top of the screen and sorted in alphabetical order. My CoCo 3 is turning into a dream computer.)

As soon as the `FTU` icon appeared, I clicked it on. A new screen with a pleasant border color and a standard *Multi-Vue* framed window with a five-item menu bar appeared on the screen. The standard Close box appears to the left of the menu, followed by a Quit menu that lets you exit `FTU` immediately. Three menus unique to `FTU` appeared to the right. These are PC

Transfer, RS-DOS *Transfer* and FLEX Transfer. I took an old FLEX disk and an MS-DOS disk and tried the different menus.

You may notice that I haven't mentioned the manual. That's because I haven't read at it yet. I like to try software before I read the manual. The FTU manual is clear, complete, concise and quite useful. My only problem occurred because I had booted my CoCo 3 with an OS9Boot file containing CC3Disk instead of SDisk3, and GCS FTU requires Dan Johnson's SDisk3 package.

Shattuck has put a lot of thought into this utility package. For example, if you put a new FLEX, PC or Disk BASIC disk in Drive /d0 and click on the appropriate menu title in the pull-down menu, a list of the files on that disk will appear instantly on your CoCo 3 screen. You can even ask for an extended directory listing that gives you the size and age of the files you might want to transfer.

One of the best features of this utility occurs when you are ready to read one of these foreign files. You just click on the proper menu title, move the pointer down and click on the "Read File" selection. FTU immediately presents a dialog box in the lower right hand corner of your screen, so you can type in any additional information it might need. Never fear, you won't need to remember a filename — or the file's extension — with this program. GCS leaves the directory listing on the screen so you can refer to it while you type the name of the file you want to transfer. The small dialog box doesn't get in the way at all. Nice job, Gil!

Speaking of File Transfers . . .

Recently, Jane C. Sherratt of Omaha, Neb., who uses *VIP Database* and *VIP Calc* packages and has many ASCII files, wrote to ask how she could read these files into an OS-9 word processing package to avoid retyping all the numbers. Sherratt can use a package like GCS's File Transfer Utilities to move the files from her Disk BASIC disks to an OS-9 disk. Once she has the files stored on an OS-9 disk, she should be able to open them with most OS-9 editors and word processors. Many of them recognize tabs, so the formatting from her spreadsheets should stay intact. She may even be able to load the ASCII data from *VIP Calc* into *DynaCalc*.

Even straightforward BASIC programs — those that do not use commands unique to Color Computer

```
0660      DIM Pat_Sld,Pat_Dot,Pat_Vrt,Pat_Hrz,Pat_Xhtc,Pat_Lsnt:BYTE
067B      DIM Pat_Rsnt,Pat_Sdot,Pat_Bdot:BYTE
068A
0688      (* First, the Buffer Numbers
06A7      Crp_Font:=200 \Grp_Clip:=201 \Grp_Ptr:=202
06BC      Crp_Pat2:=203 \Grp_Pat4:=204 \Crp_Pat6:=205
06D1
06D2      (* The Font Buffers
06E5      Fnt_S8x8:=1 \Fnt_S6x8:=2 \Fnt_C8x8:=3
06FA
06F8      (* The Monse Pointer Buffers
0717      Ptr_Arr:=1 \Ptr_Pen:=2 \Ptr_Lch:=3 \Ptr_Slp:=4
0733      Ptr_Ill:=5 \Ptr_Txt:=6 \Ptr_Sch:=7
0748
0749      (* The Window regions for the Monse
076C      WR_Cntnt:=0 \WR_Cntrl:=1 \WR_OfWin:=2
0781
0782      (* The Pattern Bnffers
0798      Pat_Sld:=0 \Pat_Dot:=1 \Pat_Vrt:=2 \Pat_Hrz:=3 \Pat_Xhtc:=4
07BB      Pat_Lsnt:=5 \Pat_Rsnt:=6 \Pat_Sdot:=7 \Pat_Bdot:=8
07D7
07DB      DIM _update,wxmin,wymin,timout,cur_wind,moussig,miscsig,wait

           :BYTE
07FB      DIM sigcode,statns,wpath:INTECER
080A
080B      wxmin:=40 \(* minimnm screen width for onr window
0838      wymin:=24 \(* minimum screen height
0857
0858      _npdate:=3 \(* update rate for the mouse
087B      timout:=10 \(* timeout between clicks
089B      Follow:=1 \(* update cursor when mouse moves, 0 for no follow.
08B5
08D6      cnr_wind:=0 \(* flag to fork a process on current window
0908      moussig:=10 \(* signal code retnrned by the monse when
0938      mlscsig:=15 \(* miscellaneous signal code
095B      wait:=20 \(* signal code to wait for bntton to be pressed
0991
0992      (* After we define -- or "type" -- the special data structnres
09D0      (* we need for a Multi·Vue based program, we must initialize
0A0C      (* the data in those structures.
0A2C
0A2D      DIM _tanitms(9):Mistr
0A3B      _tanitms(1)._mnttl:="Calc"+EndStr \_tanitms(1)._mienbi:=MNEnbl
0A5E      _tanitms(2)._mnttl:="Clock"+EndStr \_tanitms(2)._mienbl:=MNEnbl
0AB2      _tanitms(3)._mnttl:="Calendar"+EndStr \_tanitms(3)._mienbl:=MNEnbl
0AA9      _tanitms(4)._mnttl:="Control"+EndStr \_tanitms(4)._mienbl:=MNEnbl
0ACF      _tanitms(5)._mnttl:="Printer"+EndStr \_tanitms(5)._mienbl:=MNEnbl
0AF5      _tanitms(6)._mnttl:="Port"+EndStr \_tanitms(6)._mienbl:=MNEnbl
0B18      _tanitms(7)._mnttl:="Help"+EndStr \_tanitms(7)._mienbl:=MNDsbl
0B3B      _tanitms(8)._mnttl:="Shell"+EndStr \_tanitms(8)._mienbl:=MNEnbl
0B5F      _tanitms(9)._mnttl:="Clipboard"+EndStr \_tanitms(9)._mienbl

           :=MNDsbl
0887
0B88      DIM _filitms(6):Mistr
0B96      _filitms(1)._mnttl:="New"+EndStr \_filitms(1)._mienbl:=MNDsbl
0BB8      _filitms(2)._mnttl:="Open"+EndStr \_filitms(2)._mienbl:=MNDsbl
0BDB      _filitms(3)._mnttl:="Save"+EndStr \_filitms(3)._mienbl:=MNDsbl
0BFE      _filitms(4)._mnttl:="Abandon"+EndStr \_filitms(4)._mienbl:=MNDsbl
0C24      _filitms(5)._mnttl:="Print"+EndStr \_filitms(5)._mienbl:=MNDsbl
0C48      _filitms(6)._mnttl:="Qnit"+EndStr \_filitms(6)._mienbl:=MNEnbl
0C6B
0C6C      DIM _editms(6):Mistr
0C7A      _editms(1)._mnttl:="Undo"+EndStr \_editms(1)._mienbl:=MNDsbl
0C9D      _editms(2)._mnttl:="Cut"+EndStr \_editms(2)._mienbl:=MNDsbl
0CBF      _editms(3)._mnttl:="Copy"+EndStr \_editms(3)._mienbl:=MNDsbl
0CE2      _editms(4)._mnttl:="Paste"+EndStr \_editms(4)._mienbl:=MNDsbl
0D06      _editms(5)._mnttl:="Clear"+EndStr \_editms(5)._mienbl:=MNEnbl
0D2A      _editms(6)._mnttl:="Show"+EndStr \_editms(6)._mienbl:=MNDsbl
0D4D
0D4E      (* Now we'll set up the entire menn
0D71
0D72      DIM Tndy_Mn:mnstr
0D7B      Tndy_Mn._mittl:="Tandy"+EndStr \Tndy_Mn._mnid:=MN_Tndy
0D9B      Tndy_Mn._mnxsiz:=10 \Tndy_Mn._mnnits:=9
0DB1      Tndy_Mn._mnenabl:=MNEnbl \Tndy_Mn._mnitems:=ADDR(_tanitms)
0DCB
0DCC      DIM File_Mn:mnstr
0DD5      File_Mn._mittl:="Files"+EndStr \File_Mn._mnid:=MN_File
0DF5      File_Mn._mnxsiz:=10 \File_Mn._mnnits:=6
0E0B      File_Mn._mnenabl:=MNEnbl \File_Mn._mnitems:=ADDR(_filitms)
```

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Sample Calligrapher Hershey Fonts

The CoCo Calligrapher!

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BASIC — can be transferred over to an OS-9 file and run with BASIC09. To do this, make sure that you save the source code of your Disk BASIC file in ASCII. Before you attempt to load the file into BASIC09, however, use your favorite editor to insert the line:

```
PROCEDURE nameofprogram
```

at the front of *your Disk* BASIC program. (The 'P' must be the *first* character in the file.)

"Error 221 means OS-9 couldn't locate the module requested, while Error 249 means the disk inserted in a drive isn't compatible with the drive's present configuration."

Getting Started With *Multi-Vue*

Melvin Grow in Alameda, Calif., wrote to ask for help in starting *Multi-Vue*. In its present format, he can't access his files in Drive 1. Having transferred all his OS-9 files to a 40-track disk, Grow finds *Multi-Vue* unfriendly, and wonders why Tandy used BuildMV instead of *Config* so that users could match their hardware configuration.

Grow reported receiving the infamous 221 and 249 errors. Let's look at those first. Error 221 means that OS-9 could not locate the module requested. Error 249 means that the disk inserted in a drive is not compatible with the present configuration of the drive (i.e., you would get Error 249 if you inserted a double-sided disk in a drive with its device descriptor configured for single-sided disks. My hardware setup is also a hybrid and would not work with BuildMV. When I couldn't run BuildMV the first time, I just installed *Multi-Vue* myself. Grow may also find this approach simpler. To see if we can solve his problem, however, let's look at BuildMV.

To begin, the procedure file saves most of the modules that it expects in your OS-9 Level II boot file to a MODULES directory. This directory is on the reverse side of the *Multi-Vue* release disk from Tandy. Mount this disk in Drive /d0.

```
ØE25
ØE26      DIM Edit_Mn:mnstr
ØE2F      Edit_Mn._mttl:="Edit"+EndStr \Edit_Mn._mnid:=MN_Edit
ØE4E      Edit_Mn._mnxsiz:=1Ø \Edit_Mn._mnnits:=6
ØE64      Edit_Mn._mnenabl:=MNEnbl \Edit_Mn._mnitems:=ADDR(_editms)
ØE7E
ØE7F      (* Now that we have defined the items in the menu and the menu itself,
ØEC5      (* we can define the window that we want the menu to appear in.
ØF04
ØF05      DIM Menus(3):mnstr
ØF13
ØF14      Menus(1):=Tndy_Mn \Menus(2):=File_Mn \Menus(3):=Edit_Mn
ØF35
ØF36      WndScr._wnttl:="KISSDraw"+EndStr \WndScr._nmens:=3
ØF58      WndScr._wxmin:=8Ø \WndScr._wymin:=24
ØF6E
ØF6F      (* _wnres, an array of seven reserved bytes, sits here
ØFA5      WndScr._wnsync:=WINSync \WndScr._wnmen:=ADDR(Menus)
ØFBF
ØFCØ      (* Let's create a window
ØFD8
ØFD9      RUN Gfx2(StdOut,"CurOff")
ØFEC      RUN gfx3(StdOut,"ss.wnset",ADDR(WndScr),WT_FSWin)
1ØØC      RUN gfx3(StdIn,"ss.gip",$Ø1Ø1,$FFFF)
1Ø27      RUN gfx3(StdIn,"ss.mous",$Ø3Ø1,Follow)
1Ø44
1Ø45      (* Now we can the call to set up the intercept.
1Ø74
1Ø75      CallCode:=F_Icpt
1Ø7D      Regs.x:=ADDR(IceptCode)
1Ø8B      Regs.u:=ADDR(IceptCode)+4
1Ø9C      RUN SysCall(CallCode,Regs)
1ØAB
1ØAC      RUN Gfx2("gcset",Grp_Ptr,Ptr_Arr)
1ØC3
1ØC4      (* The main loop of our program starts here
1ØEF
1ØFØ      LOOP  \(* Do this forever
11Ø4
11Ø5        PRINT
11Ø7        PRINT "Type <Control E> or <BREAK> to stop !!!"
1132
1133        IceptCode.IntResult:=Ø \(* Initialize Signal Report
1159        RUN gfx3(StdIn,"ss.msig",MouseSig)
1172
1173        (* Now we must tell the process to go to sleep until
11A7        (* it receives a signal to wake up.
11CA
11CB        CallCode:=F_Sleep
11D3        Regs.x:=Ø \(* Sleep forever -- at least till signal
12Ø6        RUN SysCall(CallCode,Regs)
1215
1216      EXITIF IceptCode.IntResult=2 THEN  \(* Escape with BREAK key
123D      ENDEXIT
1241
1242        IF IceptCode.IntResult=MouseSig THEN
1252          RUN gfx3(StdIn,"gs.mous",ADDR(msret)) \(* Go Read Mouse
127C          IF msret.stat=WR_Cntrl AND msrer.cbsa<>Ø THEN
1296            DoMenuItem:=TRUE
129C          ELSE
12AØ            DoMenuItem:=FALSE
12A6          ENDIF
12A8        ENDIF
12AA
12AB        IF DoMenuItem=TRUE THEN
12B6          RUN gfx3(StdIn,"ss.mnsel",Menu_ID,Menu_Item)
12D5          PRINT "The Menu ID is "; Menu_ID
12EC          PRINT "The Menu Item is "; Menu_Item
13Ø5
13Ø6          IF Menu_ID<>Ø THEN
1312            GOSUB 1ØØØ \(* Go handle menus
1328          ENDIF
132A        ENDIF
132C
132D      ENDLOOP
1331
1332      (* Your Program code that deals with events
135D      (* in the content region of the window goes here.
138E
```

```
138F      END
1391
1392 1000 IF Menu_ID=MN_Clos OR Menu_ID=MN_File AND Menu_Item=6 THEN
13B1        action:="Alert"
13BD        RUN DoAlert(action,"Quit Demo? ","Yes    ","","No    ",ADDR
             (WndScr))
13F1        IF LEFT$(action,3)="Yes" THEN
1403          PRINT "Thank you for trying DoMenu"
1422          GOTO 9999
1426        ENDIF
1428      ELSE
142C        IF Menu_ID=MN_Tndy THEN
1439          RUN Gfx2("gcset",Grp_Ptr,Ptr_Arr)
1450          RUN Cfx2("curoff")
145E          ON Menu_Item GOSUB 1110,1120,1130,1140,1150,1160,1170,1180
               ,1190
1489        ELSE
148D          IF Menu_ID=MN_Edit AND Menu_Item=5 THEN
14A1            PRINT CHR$($0C);  \(* Clear Screen
14B7          ENDIF
14B9        ENDIF
14BB      ENDIF
14BD      RETURN
14BF
14C0 1110 (* Calc
14CA      RUN Cfx2("OWSet",1,0,1,36,12,0,1)
14EC      SHELL "gcalc"
14F5      RUN Gfx2("OWEnd")
1502      RETURN
1504
1505 1120 (* Clock
1510      RUN Cfx2("OWSet",1,0,1,30,12,0,1)
1532      GOSUB 2000 \(* Draw nice looking box
154E      SHELL "gclock"
1558      GOSUB 3000 \(* Close box
1568      RETURN
156A
156B 1130 (* Calendar
1579      (* To run this desk accessory, you must dup the old standard
15B5      (* paths, close them, and dup new windowpath into them.  After
15F3      (* you run gcal, you must restore the old paths
1622
1623      BASE 0
1625      OPEN #newpath,"/w"
1630      RUN Cfx2(newpath,"OWSet",6,0,0,40,24,0,1,2)
165A      PRINT #newpath,CHR$($1B); CHR$($21);  \(* select the window
167F      FOR thePath=0 TO 2
168F        Regs.a:=thePath
169B        RUN SysCall(I_Dup,Regs)
16AA        oldpath(thePath):=Regs.a
16B9        CLOSE #thePath
16BF        Regs.a:=newpath
16CB        RUN SysCall(I_Dup,Regs)
16DA      NEXT thePath
16E5
16E6      SHELL "gcal"
16EE
16EF      FOR thePath=0 TO 2
16FF        CLOSE #thePath
1705        Regs.a:=oldpath(thePath)
1714        RUN SysCall(I_Dup,Regs)
1723        CLOSE #oldpath(thePath)
172C      NEXT thePath
1737      PRINT #0,CHR$($1B); CHR$($21);  \(* re-select standard paths
1762      CLOSE #newpath
1768      BASE 1
176A      RETURN
176C
176D 1140 (* Control
177A      GOSUB 4000 \(* Co open overlay window
1797      SHELL "Control"
17A2      GOSUB 3000 \(* Close overlay window
17BD      RETURN
17BF
17C0 1150 (* Print
17CB      GOSUB 4000 \(* Open overlay window
17E5      SHELL "gprint"
17EF      GOSUB 3000 \(* Close overlay window
```

Next, BuildMV prompts you to copy the modules term.wind.dt and CC3go from the MODULES directory on your OS-9 *Config* disk to the MODULES directory on the reverse side of the *Multi-Vue* release disk. When this is complete, BuildMV copies the GrfDrv file from your original OS-9 system disk to the CMDS directory on the reverse side of the *Multi-Vue* release disk.

After it moves the files, BuildMV changes its current data directory to the MODULES directory and runs the OS9Gen utility to create a new OS9Boot file.

The procedure file is complicated by several factors. First, BuildMV expects you to copy to a single disk, using only Drive /d0. Second, it expects to find the needed modules in your OS9Boot file. If you have a hybrid system, this may not be the case, and you will receive the Error 221 message.

Evidently, Grow also received an Error 249 message when he tried to copy the files from his double-sided disk, which the procedure file had instructed him to mount in Drive /d0. Since *Multi-Vue* instructed him to boot with his original OS-9 system disk, he was running a single-sided device descriptor in Drive /d0 that could not read the double-sided disk containing the files. Therefore, he received an Error 249.

I will now attempt to make *Multi-Vue*'s installation process easier to understand. Start by listing the MODULES and CMDS directories on the reverse side of the *Multi-Vue* release disk (the side the instructions tell you to use). In the MODULES directory you'll find a HELP directory, a WindInt.io module, eight new window device descriptors and a file named Bootlist.mv.

Because you use the bootlist file to tell OS9Gen which modules you want in your new OS9Boot file, we'll need to look at that file as well. When Bootlist.mv is listed, it will instruct OS9Gen to use the files that BuildMV attempted to save for you, as well as the modules on the reverse side of the *Multi-Vue* release disk, in the MODULES directory.

You will need to copy the CC3go module from the MODULES directory on your *Config* disk because the copy in memory is marked busy and cannot be saved with the OS-9 save command. If you try, you will receive an Error 209, or "Module Busy," message. Copy term-wind.dt from the *Config* disk as well because it does not exist in the OS9Boot file of the standard OS-9 Level II release disk, which BuildMV expects you to use.

After looking at this procedure, you may feel that things should not be this complicated. They aren't. To run *Multi-Vue* you only need to remove the `Grfint` module from the `OS9Boot` file and replace it with the `WindInt.io` module that comes with *Multi-Vue*, add the `Term-wind.dt` window device descriptor and the new window device descriptors `/w8` through `/w12` to the `OS9Boot` file, and keep the modules already in the `OS9Boot` file that work with your hardware. In other words, start by formatting a fresh disk. Create a `MODULES` directory on this disk with the OS-9 `makdir` utility, and save all the modules in your present `OS9Boot` file, except `grfdrv`, in the `MODULES` directory. Next, either create a procedure file of `Save` command lines (like those in `BuildMV`) with the build utility or your favorite editor, or just copy them one at a time from the keyboard.

"After you save the modules from your own `OS9Boot` file, copy the new module files from the `MODULES` directory on the reverse side of the* Multi-Vue *release disk to the directory on your freshly formatted disk."

After you save the modules from your own `OS9Boot` file, copy the new module files from the `MODULES` directory on the reverse side of the *Multi-Vue* release disk to the directory on your freshly formatted disk. Again, you can either create a procedure file to do this for you, or copy them one by one from the keyboard. Do whatever is easier for you. You must also copy the `Term-wind.dt` and `CC3go` modules to your `MODULES` directory.

Next, create a `Bootlist.mv` file in that directory, using either the build utility or your editor. That bootlist should include both the names of each module you saved earlier and the modules copied from the *Multi-Vue* release disk and the OS-9 *Config* disk.

Now run `OS9Gen` and create your new `OS9Boot` file. If you mounted your new disk in Drive `/d1` and are running from an execution directory in a disk

```
18ØA       RETURN
18ØC
18ØD 116Ø (* Port
1817       GOSUB 4ØØØ \(* Open Overlay
182A       SHELL "gport"
1833       RUN Gfx2("OWEnd")
184Ø       RETURN
1842
1843 117Ø (* Help
184D       RETURN
184F
185Ø 118Ø (* Shell
185B       RUN Gfx2("GCSet",Ø,Ø) \(* Turn graphic cursor off
1888       RUN Gfx2("OWSet",1,1,8,72,12,1,Ø) \(* Create Overlay Window
18C2       RUN Gfx2("CurOff")
18DØ       RUN gfx3(StdOut,"ss.wnset",ADDR(WndScr),WT_DBox) \(* Make Window
18FE       RUN Gfx2("CurOn")
19ØB       RUN Gfx2("Color",1)
191B       SHELL ""
191F       RUN Gfx2("OWEnd")
192C       RUN Gfx2("GCSet",Grp_Ptr,Ptr_Arr)
1943       RETURN
1945
1946 119Ø (* Clipboard
1955       RETURN
1957
1958 2ØØØ (* Dress up the opening box
1976       RUN Gfx2("Logic","XOR")
1989       RUN Gfx2("Color",1)
1999       HorPos:=1Ø
19AØ       REPEAT
19A2         RUN Gfx2("Box",32Ø-HorPos,96-HorPos/4,32Ø+HorPos,96+HorPos
             /4)
19D1         RUN Gfx2("Box",32Ø-HorPos,96-HorPos/4,32Ø+HorPos,96+HorPos
             /4)
1AØØ         HorPos:=HorPos*1.3
1A11       UNTIL HorPos>3ØØ
1A1D       RUN Gfx2("Logic","OFF")
1A3Ø       RUN Gfx2("Color",Ø)
1A4Ø       RETURN
1A42
1A43 3ØØØ (* Close the Box
1A56       RUN Gfx2("Logic","XOR")
1A69       RUN Gfx2("Color",1)
1A79       HorPos:=3ØØ
1A81       REPEAT
1A83         RUN Gfx2("Box",32Ø-HorPos,96-HorPos/4,32Ø+HorPos,96+HorPos
             /4)
1AB2         RUN Gfx2("Box",32Ø-HorPos,96-HorPos/4,32Ø+HorPos,96+HorPos
             /4)
1AE1         HorPos:=HorPos/1.5
1AF2       UNTIL HorPos<1Ø
1AFD       RUN Gfx2("Logic","Off")
1B1Ø       RUN Gfx2("Color",Ø)
1B2Ø       RUN Gfx2("OWEnd")
1B2D       RETURN
1B2F
1B3Ø 4ØØØ (* Make Overlay Window for Tandy Desk Acessories
1B63       RUN Gfx2("OWSet",1,Ø,Ø,38,21,Ø,1)
1B85       GOSUB 2ØØØ \(* Make the open flashy
1BAØ       RUN Gfx2("Box",Ø,Ø,639,191)
1BB8       RUN Gfx2("CurXY",1,2)
1BCB       PRINT "Please wait ... getting desk accesory from disk."
1BFF       RETURN
1CØ1
1CØ2 9999 (* Always turn off graphics cursor before leaving program
1C3E       RUN Gfx2("gcset",Ø,Ø)
1C51       END
1C53
```

Listing 4: `DoAlert`

```
PROCEDURE DoAlert
 ØØØØ       (* display Alert boxes and get response for DoMenu
 ØØ32       PARAM action,query,msg1,msg2,msg3:STRING
 ØØ49       PARAM WindowAddr:INTEGER
```

```
0050
0051        DIM button1,button2,button3:STRING
0060        DIM F_Sleep,CallCode,StdIn,StdOut:BYTE
0073        DIM WT_DBox:INTEGER
007A        DIM MouseSig,HorP,VerP:INTEGER
0089
008A        TYPE rodent=valid,actv,totm:BYTE; rsrv0:INTEGER; ttto:BYTE; tsst

             :INTEGER; cbsa,cbsb,ccta,cctb,ttsa,ttsb,tIsa,tlsb:BYTE

             ; rsrv1,bdx,bdy:INTEGER; stat,res:BYTE; acx,acy,wrx,wry

             :INTEGER
00FB        DIM msret:rodent
0104
0105        TYPE Registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
012A        DIM Regs:Registers
0133
0134        TYPE IntGeptCod=StBCode:BYTE; IntAddr:INTEGER; RTICode,IntResult

             :BYTE
014F        DIM IceptCode:IntCeptCod
0158
0159        IceptCode.StBCode:=$F7
0165        IceptCode.IntAddr:=ADDR(IceptCode)+4
0176        IceptCode.RTICode:=$3B
0182
0183        StdIn:=0 \StdOut:=1 \F_Sleep:=$0A \WT_DBox:=4 \MouseSig:=10
01A7
01A8        RUN gfx2("OWSet",1,3,4,28,6,2,3)
01CA        RUN gfx2("CurOff")
01D8        RUN gfx3(StdOut,"ss.wnset",WindowAddr,WT_DBox)
01F7
01F8        IF LEN(query)=0 THEN query:="What is your choice? "
0220        ENDIF
0222
0223        PRINT query \ PRINT
022A        button1:=msg1 \button2:=msg2 \button3:=msg3
0242
0243        WHILE LEN(button1)<8 DO
0250          button1:="   "+button1
025E        ENDWHILE
0262
0263        WHILE LEN(button2)<8 DO
0270          button2:="   "+button2
027E        ENDWHILE
0282
0283        WHILE LEN(button3)<8 DO
0290          button3:="   "+button3
029E        ENDWHILE
02A2
02A3        PRINT button1; button2; button3;
02B1
02B2        IF button1<>"          " THEN
02C8          RUN gfx2("Box",20,80,208,160)
02DF        ENDIF
02E1
02E2        IF LEFT$(button2,8)<>"        " THEN
02F9          RUN gfx2("Box",220,80,405,160)
0311        ENDIF
0313
0314        RUN gfx2("Box",420,80,605,160) \RUN gfx2("Box",430,85,595,155

             )
0346
0347        RUN gfx3(StdIn,"ss.msig",MouseSig) \(* Set Mouse SignaI
0373
0374        CallCode:=F_Sleep
037C        Regs.x:=0 \(* Sleep until mouse is clicked
03A6        RUN SysCall(CallCode,Regs)
03B5
03B6        RUN gfx3(StdIn,"gs.mous",ADDR(msret))
03D0
03D1        HorP:=msret.acx
03DC        VerP:=msret.acy
03E7
03E8        HorP:=HorP*80/18
03F6        VerP:=VerP*24/4
0404
0405        action:="No"
040E
040F        IF msret.stat=0 AND VerP>192/6*3 THEN
```

mounted in Drive /d0, just type the following command line and enter to finish the job:

```
os9gen /d1 <bootlist.mv
```

When OS9Gen finishes, you'll have a new OS9Boot. Now, create a CMDS directory on your new disk and copy the Shell and GrfDrv files from the CMDS directory on the disk you had been using. If you want to run *Multi-Vue* immediately upon startup, add to your new CMDSdirectory the new files supplied in the CMDS directory on the front side of the *Multi-Vue* release disk, along with the AutoEx and MultiStart files from the directory on the back of that disk.

You can also boot up from the disk you just made if both Shell and GrfDrv are on its CMDS directory. You can then remove that disk and mount the system disk you normally use. After you put your old disk in the drive, type the following:

```
chd /d0 and chx /d0/cmds
```

to switch your current directories to it. To run *Multi-Vue* from your disk, copy the new *Multi-Vue* files for the CMDS directories on both sides of the *Multi-Vue* release disk into your own CMDS directory. To start *Multi-Vue* from your disk, just type "multistart".

I hope I've taken some of the mystery out of *Multi-Vue*'s installation process.

Our Listings

You'll find the source for ClkSpd and ClkChk, additional code with liberal comments for *MVShell* and another handy utility from Stephen Goldberg in this issue. Goldberg's *Strip* removes any leading or trailing spaces from your text files to save space on your disk. The command lines look like this:

```
strip myfile
strip 8 myfile
strip +30 myfile
strip -10 myfile
```

The first line removes all leading spaces from each line. The second strips eight characters from each line. The next strips all characters past column 30, and the last strips the last 10 characters from each line. *Strip*, another fine example of OS-9 assembly language programming, certainly beats editing each line.

That's it for this month. Until next month, keep on hacking! □

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```
0428        IF HorP<48Ø THEN
0438          action:=msgl
0440        ENDIF
0442      ENDIF
0444      RUN gfx2("CurOn")
0451      RUN gfx2("OWEnd")
045E      END
0460
```

Listing 5: Strip

```
*******************************************************
*
* STRIP  -  COPYRIGHT (c) 1987 by S.B.GOLDBERG
*
* Strip all leading spaces or indicated number
* of leading or trailing characters from lines
*
* Use: strip [[+/-]count] [filename] [...]
*      no count = strip leading spaces
*      count = strip # leading characters
*      +count = strip characters after # column
*      -count = strip # trailing characters
*      count limits = 1 - 255 characters
*
* Standard output path can be redirected
*
* Omit filename(s) for standard input path to
* use in pipeline or with input redirection
*
        ifpl
        use   /dØ/defs/os9defs
        endc
*
        mod   len,name,prgrm+objct,reent+1,entry,dsiz
*
flag    rmb   1   function flag
path    rmb   1   input path number
count   rmb   2   count storage
pointer rmb   2   parameter pointer
buffer  rmb   255   I/O line buffer
        rmb   2ØØ   stack
        rmb   2ØØ   parameters
dsiz    equ
*
name    fcs   /Strip/
        fcb   1   edition number
        fcc   /(c)1987 S.B.Goldberg/
*******************************
* CONVERT DECIMAL TO BINARY
*******************************
binary  bsr   convert   convert first digit
        bsr   convert   convert next 2 digits
convert lda   ,x   get character
        suba  #'Ø   make binary
        bmi   back   not valid digit
        cmpa  #9   valid digit?
        bhi   back   no
        pshs  a   yes, save it
        lda   1+count   get previous total
        ldb   #1Ø   multiply by 1Ø
        mul
        addb  ,s+   add current value
        stb   1+count   save new total
        leax  1,x   bump pointer
back    rts   return
*******************************
* INITIALIZE
*******************************
entry   clra
        clrb
        std   flag   standard input & clear flag
        std   count   zero count
        lda   ,x   parameter character
        cmpa  #'-   end strip?
        bne   plus   no, check for plus
        dec   flag   yes, set flag
        bra   bumpit   continue
plus    cmpa  #'+   strip past offset?
        bne   chknum   no, check for count
        inc   flag   yes, set flag
bumpit  leax  1,x   bump pointer
chknum  bsr   binary   decimal count to binary
*******************************
* FIND FILENAME AND OPEN FILE
*******************************
look    lda   ,x   parameter character
        cmpa  #$2Ø   filename?
        blo   savpoint   no, standard input
        bhi   open   yes, open file
        leax  1,x   bump pointer
        bra   look   look again
open    lda   #read.   read mode
        os9   I$open   open file
        bcs   out   exit with error
        sta   path   save path number
savpoint stx   pointer   save parameter pointer
*******************************
* READ LINES FROM FILE
*******************************
read    ldy   #255   maximum line length
        leax  buffer,u   line buffer
        lda   path   input path number
        os9   I$readln   get line
        bcs   error   branch on error
*******************************
* STRIP CHARACTERS
*******************************
        ldd   count   strip spaces?
        beq   spacloop   yes, do it
        tst   flag   strip past offset?
        bgt   setend   yes, set new line end
        cmpy  count   strip entire line?
        bhi   test   no, continue
```


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```
         tfr   x,y   buffer address
         bra   cr    make blank line
test     tst   flag  end strip?
         bmi   endstrip   yes, keep buffer pointer
         leax  d,x   no, reset buffer pointer
endstrip tfr   y,d   length read
         subd  count   less strip count
         tst   flag  end strip?
         bpl   setend   no, continue
         decb  strip carriage return
setend   leay  d,x   end of line
cr       ldb   #$0d  carriage return
         stb   ,y    to end of line
*******************************
* OUTPUT STRIPPED LINES
*******************************
write    inca  standard output path
         ldy   #256  maximum length
         os9   i$writln   to screen
         bcc   read   continue if no error
*******************************
* ERROR CHECK AND TERMINATE
*******************************
error    cmpb  #e$eof  end of file?
         bne   out   quit with other error
         ldx   pointer  parameter pointer
         lda   ,x    parameter character
         cmpa  #$0d  another filename?
         bne   open  yes, open file
         clrb  clear error
out      os9   f$exit   quit
*******************************
* STRIP LEADING SPACES
*******************************
spacloop ldb   ,x    character
         cmpb  #$20  space to skip?
         bne   endstrip   no, display line
         leay  -1,y  decrement length
         leax  1,x   increment pointer
         bra   spacloop
*
         emod
len      equ   *
         end
```

Listing 6: MakeStrip

```
PROCEDURE makestrip
  0000      (* Generates the module "Strip" in the CMDS directory *)
  0038      (* The "Attr" utility MUST be in execution direcrory *)
  006F      (* or in memory for Makestrip to operate correctly *)
  00A4      (* For Level I OS-9 change "/dd" in pathlists to "/d0" *)
  00DD      DIM path,byt:BYTE
  00E8      DIM count:INTEGER
  00EF      CREATE #path,"/dd/cmds/strip":WRITE
  0108      FOR count=1 TO 208
  0118        READ byt
  011D        PUT #path,byt
  0127      NEXT count
  0132      CLOSE #path
  0138      SHELL "attr /dd/cmds/strip e pe"
  0154      END
  0156      DATA 135,205,0,208,0,13,17,129,248,0,67,2,149,83,116
  0187      DATA 114,105,240,1,40,99,41,49,57,56,55,32,83,46,66
  01B8      DATA 46,71,111,108,100,98,101,114,103,141,2,141,0,166
  01E6      DATA 132,128,48,43,17,129,9,34,13,52,2,150,3,198,10,61
  021A      DATA 235,224,215,3,48,1,57,79,95,221,0,221,2,166,132
  024B      DATA 129,45,38,4,10,0,32,6,129,43,38,4,12,0,48
  027C      DATA 1,141,200,166,132,129,32,37,15,34,4,48,1,32,244
  02AD      DATA 134,1,16,63,132,37,78,151,1,159,4,16,142,0,255
  02DE      DATA 48,70,150,1,16,63,139,37,48,220,2,39,60,13,0
  030F      DATA 46,24,16,156,2,34,4,31,18,32,17,13,0,43,2
  0340      DATA 48,139,31,32,147,2,13,0,42,1,90,49,139,198,13
  0371      DATA 231,164,76,16,142,1,0,16,63,140,36,195,193,211,38
  03A2      DATA 9,158,4,166,132,129,13,38,172,95,16,63,6,230,132
  03D3      DATA 193,32,38,209,49,63,48,1,32,244,159,244,189
```


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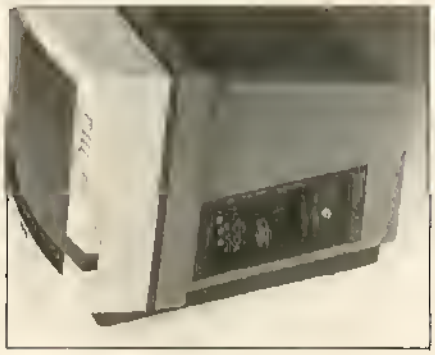

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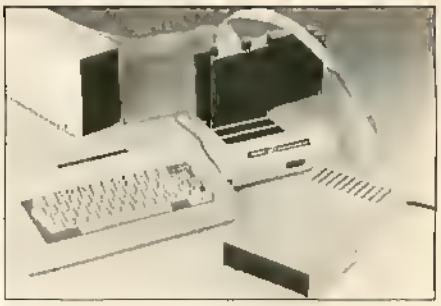

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